

# Hunters Point Naval Shipyard, Parcel G, RSY Data Report

Contract No. N62473-17-D-006 CTO N6247318F5065 RSY Pad Data Report							
RSY Pad: RSY 15 Use 2				Soil Origin: TU-098B SFU			
Data attached and submitted by: Amy Mangel				Data Report Submittal Date: 01/04/2021			

Systematic Soil Sample Data: RSY 15 Use 2							
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 NaI Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	Total Beta Sr Final Analytical Results (pCi/g)
<b>Project Remediation Goals*</b>							
HPPG-SFU-TU098B-001	1	Systematic	11,662	15,658	0.346	-0.0671	-0.0367
HPPG-SFU-TU098B-002	2	Systematic	12,334	15,658	0.321	-0.0356	N/A
HPPG-SFU-TU098B-003	3	Systematic	12,135	15,658	0.108	0.0262	N/A
HPPG-SFU-TU098B-004	4	Systematic	12,192	15,658	0.329	0.0154	N/A
HPPG-SFU-TU098B-005	5	Systematic	12,220	15,658	0.0968	0.0250	N/A
HPPG-SFU-TU098B-006	6	Systematic	12,400	15,658	0.253	0.00474	N/A
HPPG-SFU-TU098B-007	7	Systematic	12,498	15,658	0.406	0.0229	N/A
HPPG-SFU-TU098B-008	8	Systematic	12,709	15,658	0.357	-0.0349	N/A
HPPG-SFU-TU098B-009	9	Systematic	13,016	15,658	0.307	0.00195	N/A
HPPG-SFU-TU098B-010	10	Systematic	12,751	15,658	0.680	0.109	N/A
HPPG-SFU-TU098B-011	11	Systematic	12,606	15,658	0.370	0.0226	0.0517
HPPG-SFU-TU098B-012	12	Systematic	12,374	15,658	0.490	0.000	N/A
HPPG-SFU-TU098B-013	13	Systematic	12,749	15,658	0.310	-0.0346	N/A
HPPG-SFU-TU098B-014	14	Systematic	12,544	15,658	0.453	0.00265	N/A
HPPG-SFU-TU098B-015	15	Systematic	13,036	15,658	0.352	-0.00846	N/A
HPPG-SFU-TU098B-016	16	Systematic	12,990	15,658	0.284	0.0134	N/A
HPPG-SFU-TU098B-017	17	Systematic	12,187	15,658	0.366	0.0169	N/A
HPPG-SFU-TU098B-018	18	Systematic	12,165	15,658	0.426	0.0182	N/A
HPPG-SFU-TU098B-019	19	Systematic	12,442	15,658	0.413	-0.000545	N/A
HPPG-SFU-TU098B-020	20	Systematic	13,035	15,658	0.0411	-0.0490	N/A
HPPG-SFU-TU098B-021	21	Systematic	12,584	15,658	0.417	0.0113	0.00492
HPPG-SFU-TU098B-022	22	Systematic	12,862	15,658	0.255	-0.0306	N/A
HPPG-SFU-TU098B-023	23	Systematic	12,909	15,658	0.260	0.00244	N/A
HPPG-SFU-TU098B-024	24	Systematic	10,808	15,658	0.376	0.00159	N/A
HPPG-SFU-TU098B-025	25	Systematic	13,094	15,658	0.422	-0.0247	N/A
<b>Soil Systematic Sample Statistics</b>					<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	Total Beta Sr Final Analytical Results (pCi/g)
					Maximum	0.680	0.109
					Mean	0.3376	0.0004
					Median	0.352	0.0024
					Minimum	0.0411	-0.0671
					Standard Deviation	0.1312	0.0339

Biased Soil Sample Data: RSY 15 Use 2							
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 NaI Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	Total <sup>90</sup> Sr Final Analytical Results (pCi/g)
<b>Project Remediation Goals*</b>							
HPPG-SFU-TU098B-B-001	1	Biased	11,931	15,658	0.550	0.00289	-0.0194

CPM Counts per minute

pCi/g Picocuries per gram

\* Note: Project Remediation goal (RG) is the Record of Decision RG or Offsite RBA value, whichever is higher

Instrument and Survey Summary					
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #
Gamma Walkover Survey	HPRS-10292020-PG-ROV-255	10/29/2020	RS-700	03/31/2022	5447/5448
Follow-Up Static Survey	HPRS-10292020-PG-JSS-257	10/29/2020	RS-700	03/31/2022	5447/5448
Systematic Sample Survey	HPRS-10292020-PG-JSS-251	10/29/2020	3x3	08/06/2021	108853
Biased Sample Survey	HPRS-10302020-PG-JSS-259	10/30/2020	3x3	08/06/2021	108853

Region of Interest (ROI) Summary	
ROI	Nuclide and Energy
ROI 3	Ra-226 (1764 keV)
ROI 6	Ra-226 (609 keV)
ROI 7	Cs-137 (662 keV)
ROI 8	Ra-226 (351 keV)
ROI 10	Gross Gamma

Summary: RSY 15 Lift 2
1) Gamma walkover survey and data review—upon review of initial RS-700 scan data in accordance with Final Parcel G Work Plan Section 3.5.1.1, 25 follow-up static investigations were required. Gamma scan data summary statistics, normal Q-Q plots, histograms, and box plots are provided on pages 3-6. Contour maps of the scan data for the ROIs of interest are presented on page 7. The RSY scan data was lower than the background scan data. The exact same RS-700 and detectors were used for the background data collection and the RSY pad data collection.
2) One-minute static follow-up measurements with the RS-700 were collected at 25 gamma walkover investigation locations in accordance with Final Parcel G Work Plan Section 3.3.1. A map of the follow-up locations is presented on page 9. The net follow-up static spectra are presented on pages 14-38. The exact same RS-700 and detectors were used for the background data collection and the RSY pad data collection.
3) In accordance with Final Parcel G Work Plan Section 3.4.1, twenty-five systematic soil samples (001-025) were obtained and submitted for gamma spectroscopy analysis. Sample locations are shown on the Systematic Sample Survey map (page 10). TestAmerica sample results are attached (pages 39-73). Ten percent of the systematic soil samples (three samples in total -001, -011, & -021) were also analyzed for total strontium. Total Strontium results are also included in the TestAmerica sample results report (pages 39-73). Samples HPPG-F-025 and HPPG-F-026 are field duplicates, correlating to systematic samples -011 and -025. The Data Quality Assessment which will be included in the RACR will provide an analysis and discussion of field duplicates for the project. The Instrument and Survey Summary table above lists the 3x3 NaI detector used for the gamma static measurements collected during sampling activities, and the instrument-specific gamma static IL listed in the sample tables on page one is developed from that instrument's RBA data.
Systematic sample histograms, box plots, Q-Q plots, and power curves are provided on pages 12-13. All sample results were below the applicable RGs. The number of samples collected was sufficient to meet project DQOs.
4) In accordance with Final Parcel G Work Plan Section 3.3.1 and 3.4.1, one biased sample was collected since all follow-up static measurements were below the ROC-specific critical levels. The biased sample was collected from the location of the highest gross gamma scan measurement. TestAmerica sample results are attached (pages 74-88). A map of the biased sample location is presented on page 11. Biased sample results were all below the applicable RGs.
<b>Conclusions:</b>  In accordance with the DQOs in Section 3.1 of the Final Parcel G Work Plan, final analytical results for all samples from the RSY pad were shown by a point by point comparison to meet the RGs. Graphical comparisons demonstrated that ROC concentrations were consistent with background.  RSY 15 Lift 2 contains soil from Hunters Point Naval Shipyard Parcel G Phase 1 excavation TU-098B SFU.  APTIM requests RASO concurrence to release this soil as Non-LLRW. Disposition: This soil shall be used as backfill for TU-098.

## Soil Scan Statistics

### Statistical Summary

Dataset	PG-RSY-15-U2					
	ROI	Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)	Standard Deviation (cps)
ROI-03		6.01	36.09	18.60	18.04	4.36
ROI-06		71.15	154.35	110.85	110.28	11.96
ROI-07		54.11	116.26	83.11	83.18	10.00
ROI-08		95.20	184.37	138.42	138.33	12.97
ROI-10		2,461.33	3,093.70	2,824.11	2,844.88	117.37

### Statistical Summary Reference Background

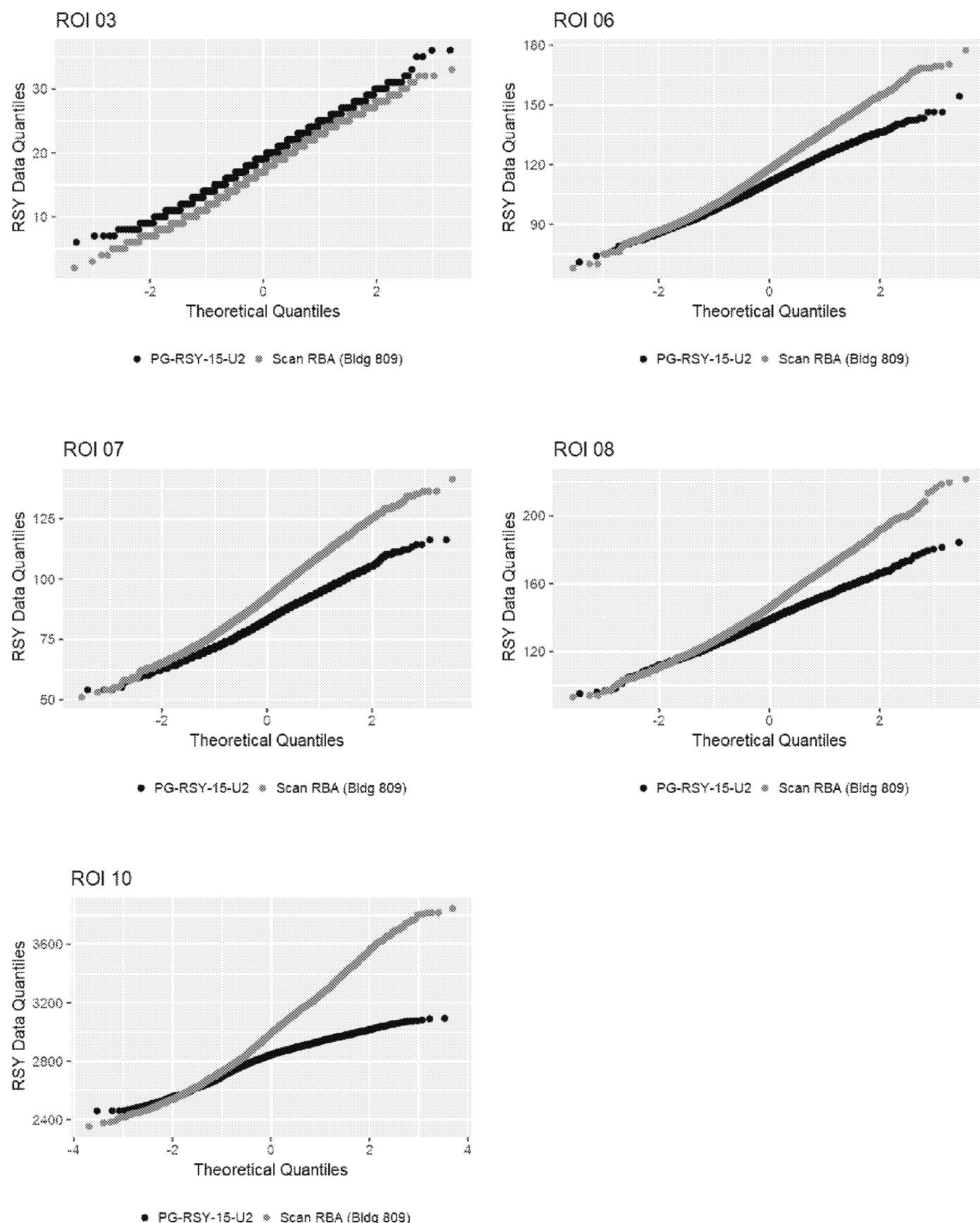
TYPE	Scan RBA (Bldg 809)					
	ROI	Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)	Standard Deviation (cps)
ROI-03		2.00	33.08	16.21	16.04	4.13
ROI-06		68.15	177.45	117.58	117.26	15.50
ROI-07		51.11	141.33	92.34	91.24	13.43
ROI-08		93.19	221.48	146.24	145.30	18.21
ROI-10		2,354.11	3,845.31	2,995.57	2,989.64	255.66

cps = counts per second

Dataset	Number of Data Points
PG-RSY-15-U2	2479
Scan RBA (Bldg 809)	4632

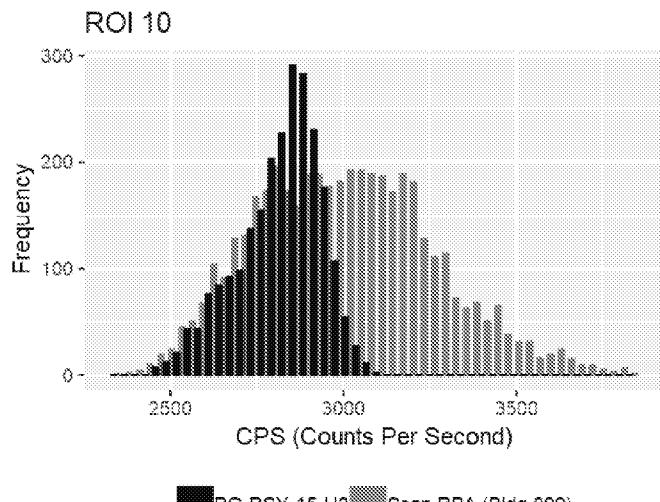
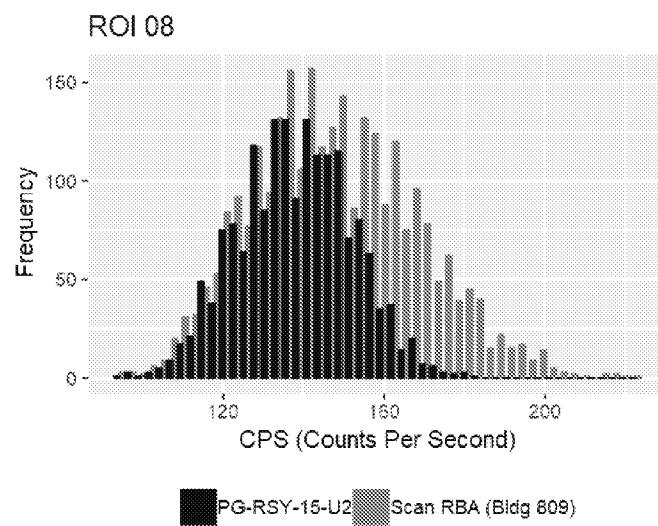
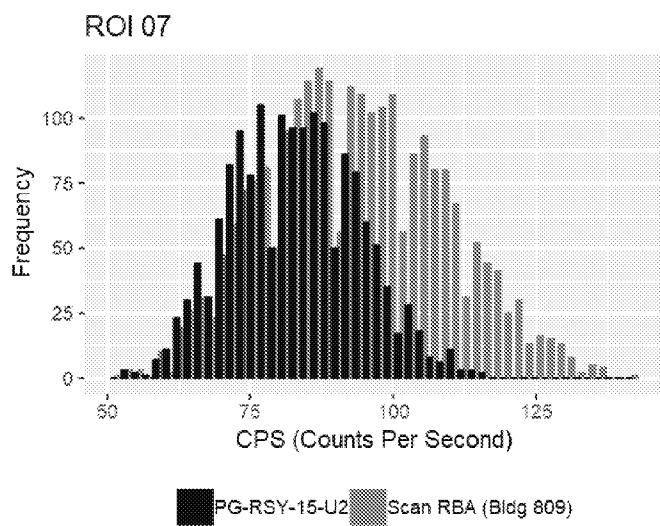
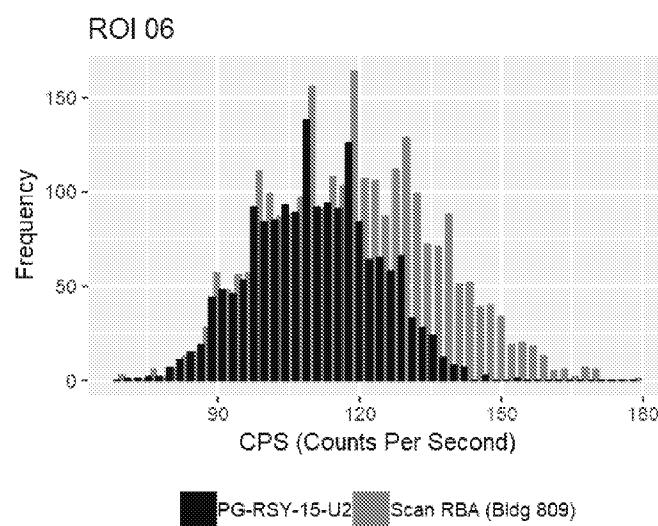
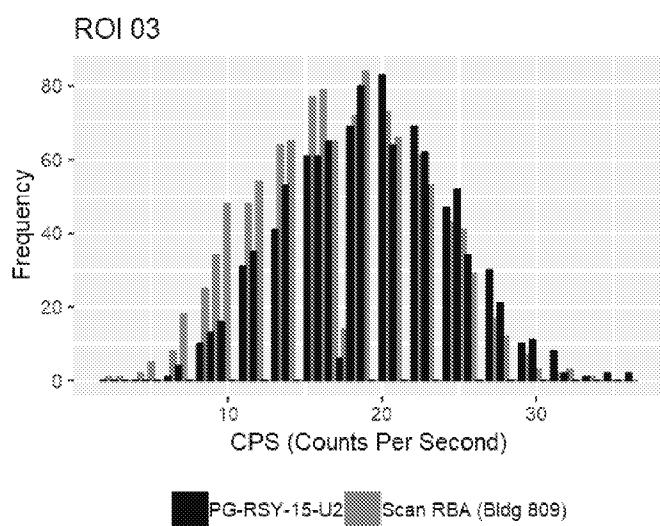
## Soil Scan Statistics

### Normal Q-Q Plots



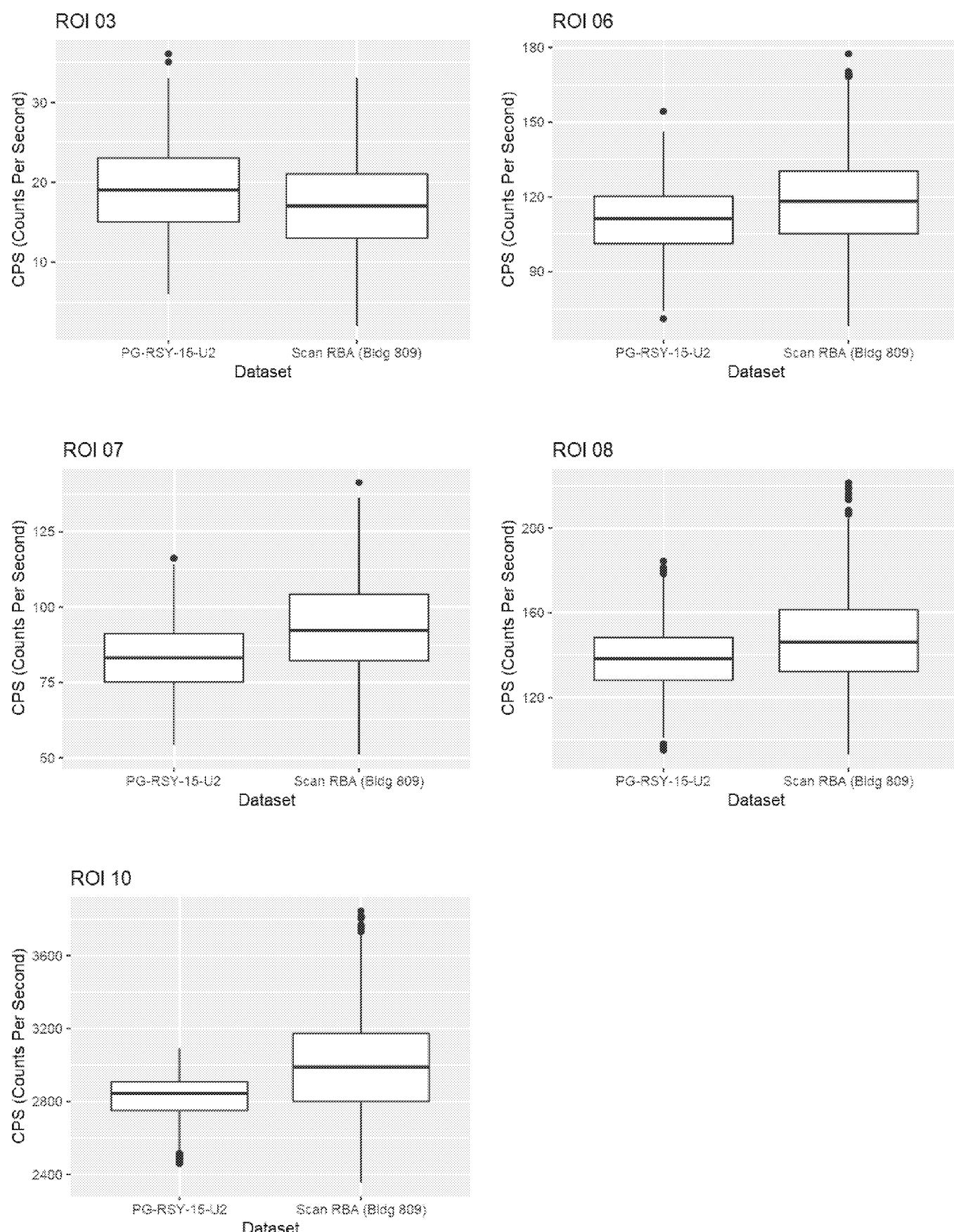
# Soil Scan Statistics

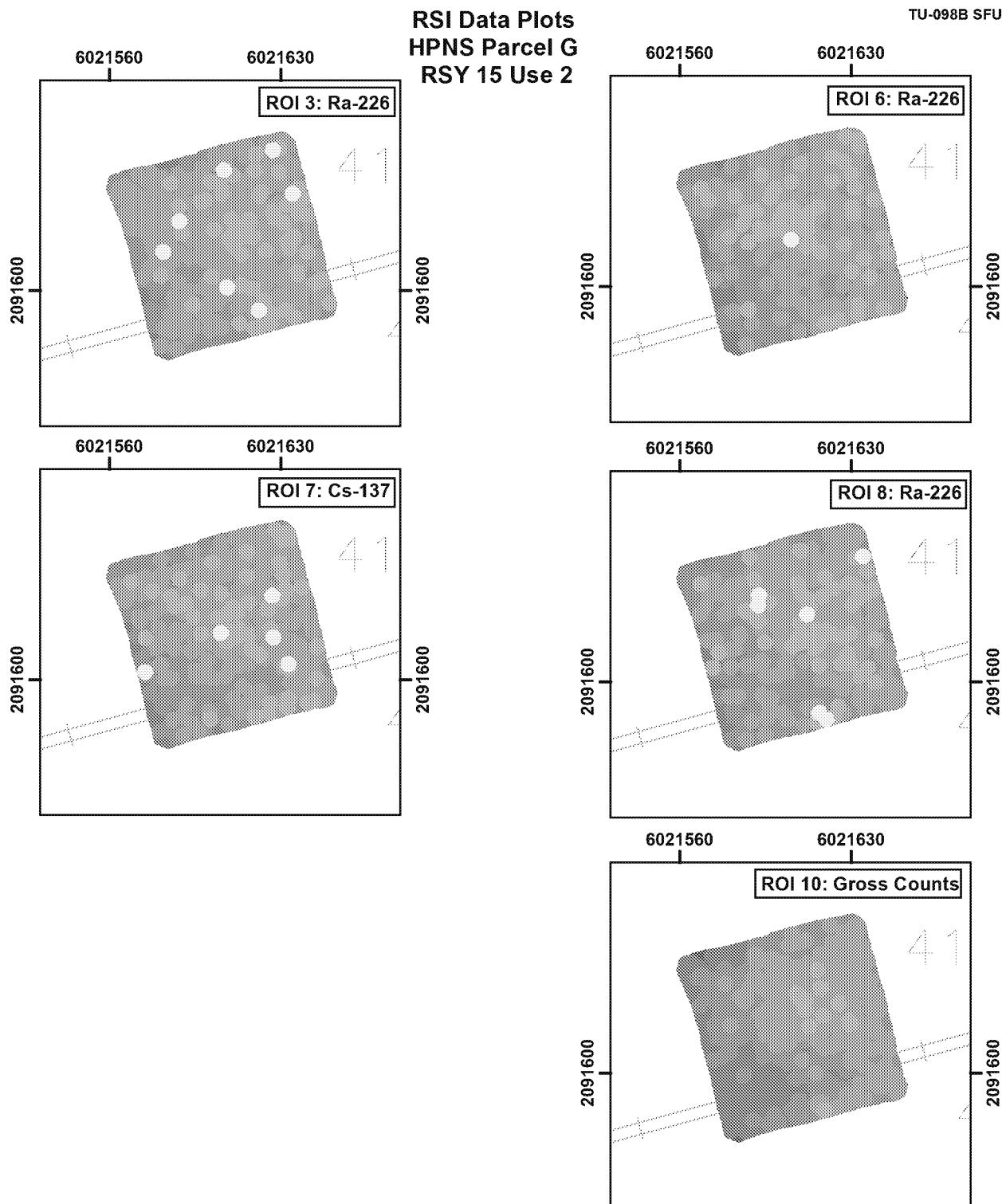
## Histograms



# Soil Scan Statistics

## Box Plots





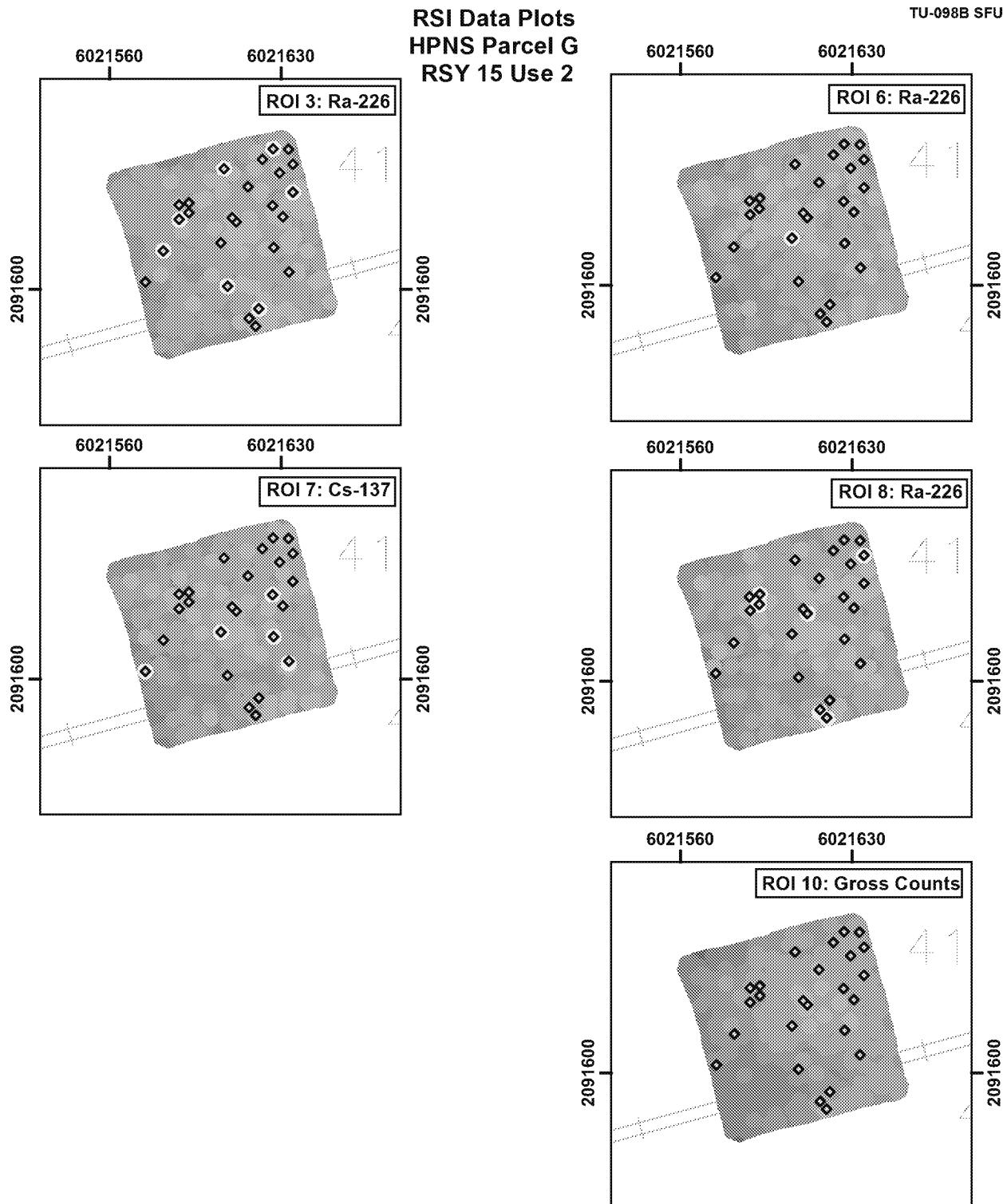
**RS 700 Gamma Walkover Survey Data (VD1)**

- |                    |                      |
|--------------------|----------------------|
| > 3 std dev        | > -1 to < 0 std dev  |
| ●                  | ●                    |
| > 2 to < 3 std dev | > -2 to < -1 std dev |
| ●                  | ●                    |
| > 1 to < 2 std dev | > -3 to < -2 std dev |
| ●                  | ●                    |
| > 0 to < 1 std dev | < -3 std dev         |
| ●                  | ●                    |

0      25      50      100  
Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



**RS 700 Gamma Walkover Survey Data (VD1)**

- ◆ Follow-Up Location
- > -1 to < 0 std dev
- > 3 std dev
- > 2 to < 3 std dev
- > 1 to < 2 std dev
- > 0 to < 1 std dev
- > -2 to < -1 std dev
- > -3 to < -2 std dev
- < -3 std dev

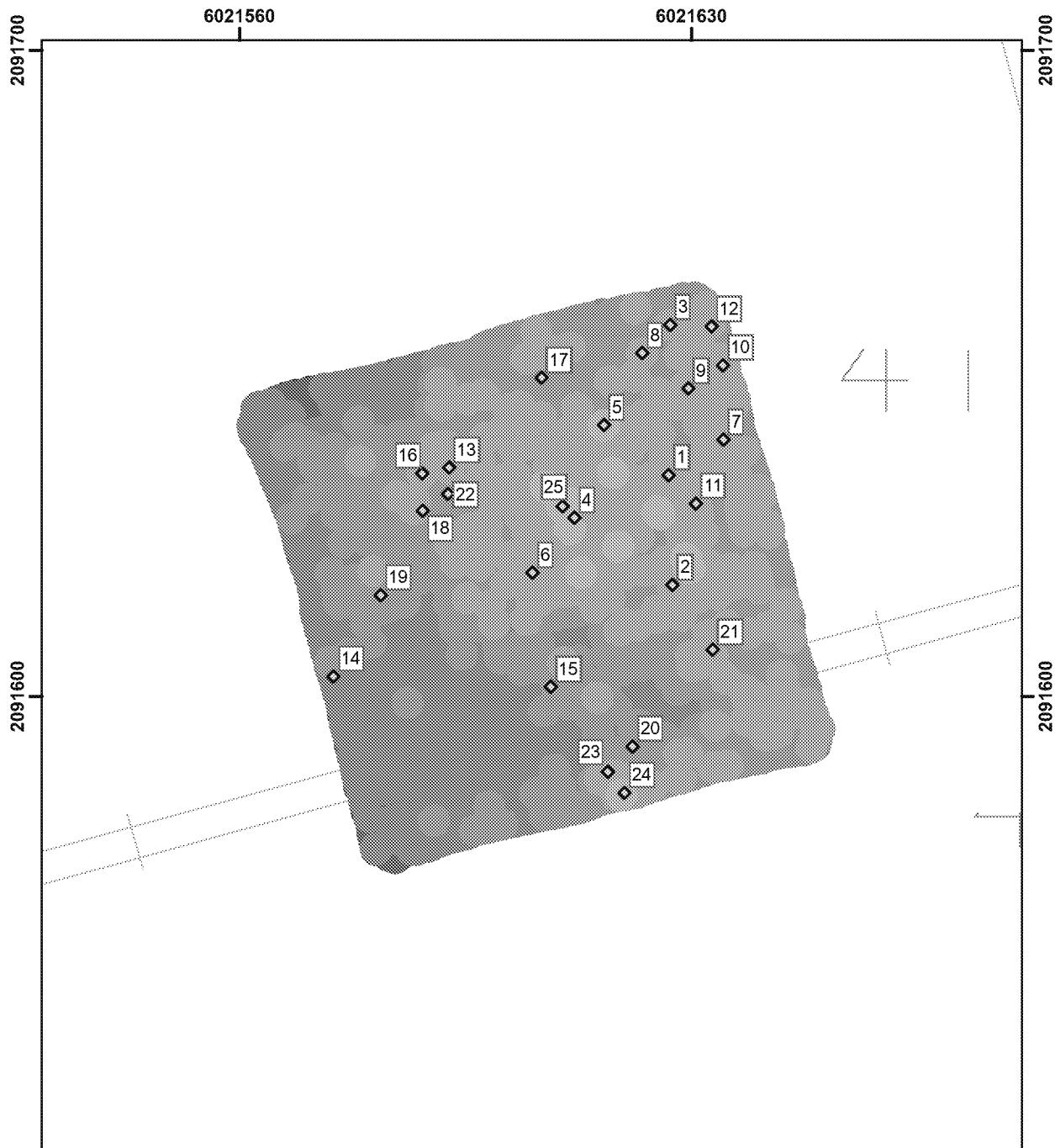
0      25      50      100  
 Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



**Follow-Up Static Survey  
HPNS Parcel G  
RSY 15 Use 2**

TU-098B SFU

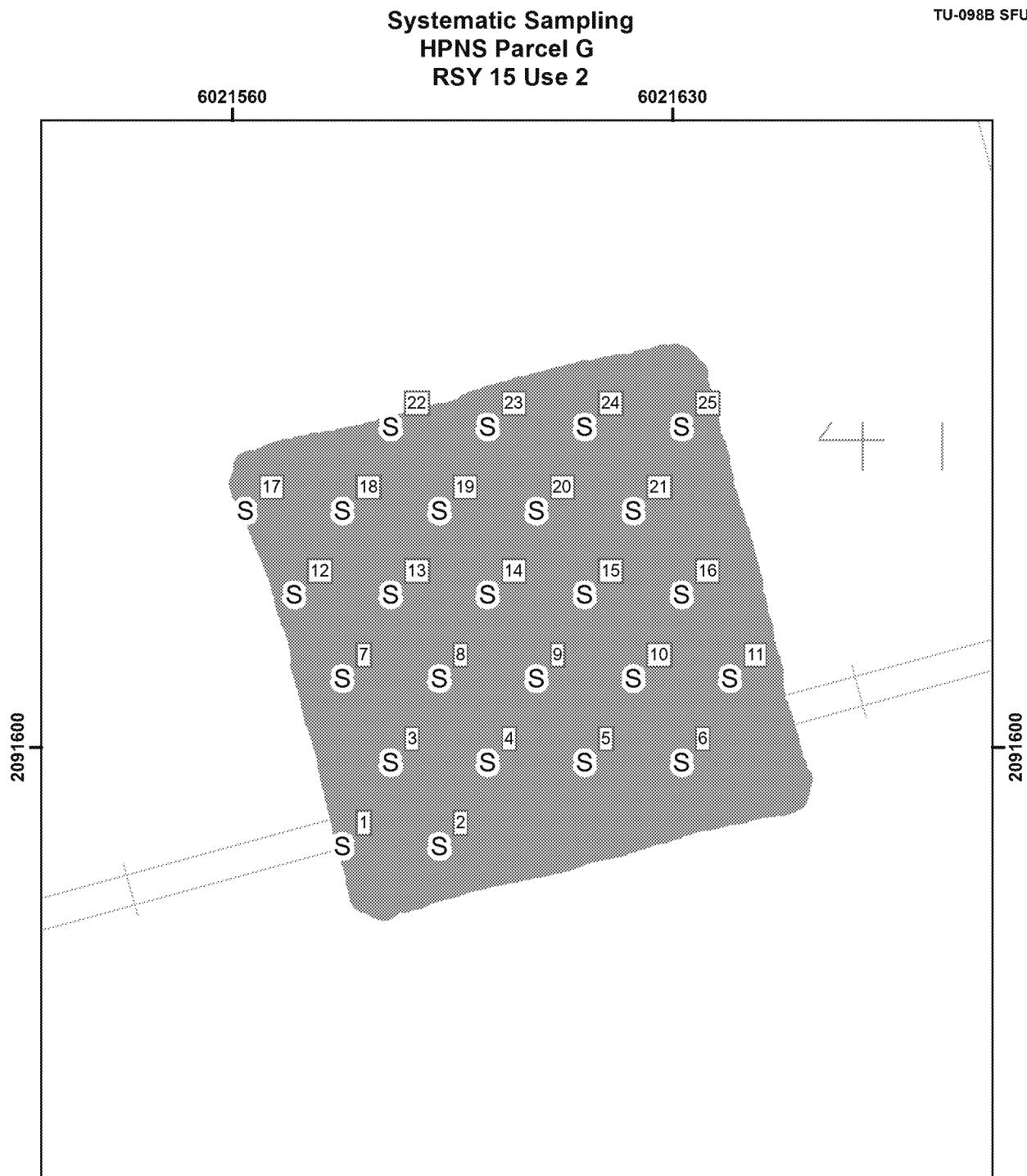
**RSY 15 Use 2 (VD1, ROI 10 Gross Gamma)**

- ◆ Follow-Up Location
- > 3 std dev
- > 2 to < 3 std dev
- > 0 to < 1 std dev
- > -1 to < 0 std dev
- > 1 to < 2 std dev
- > 0 to < 1 std dev
- > -2 to < -1 std dev
- > -3 to < -2 std dev
- < -3 std dev

25 12.5 0 25 Feet  
Coordinate system: CSP Zone III, NAD83, US Survey Foot

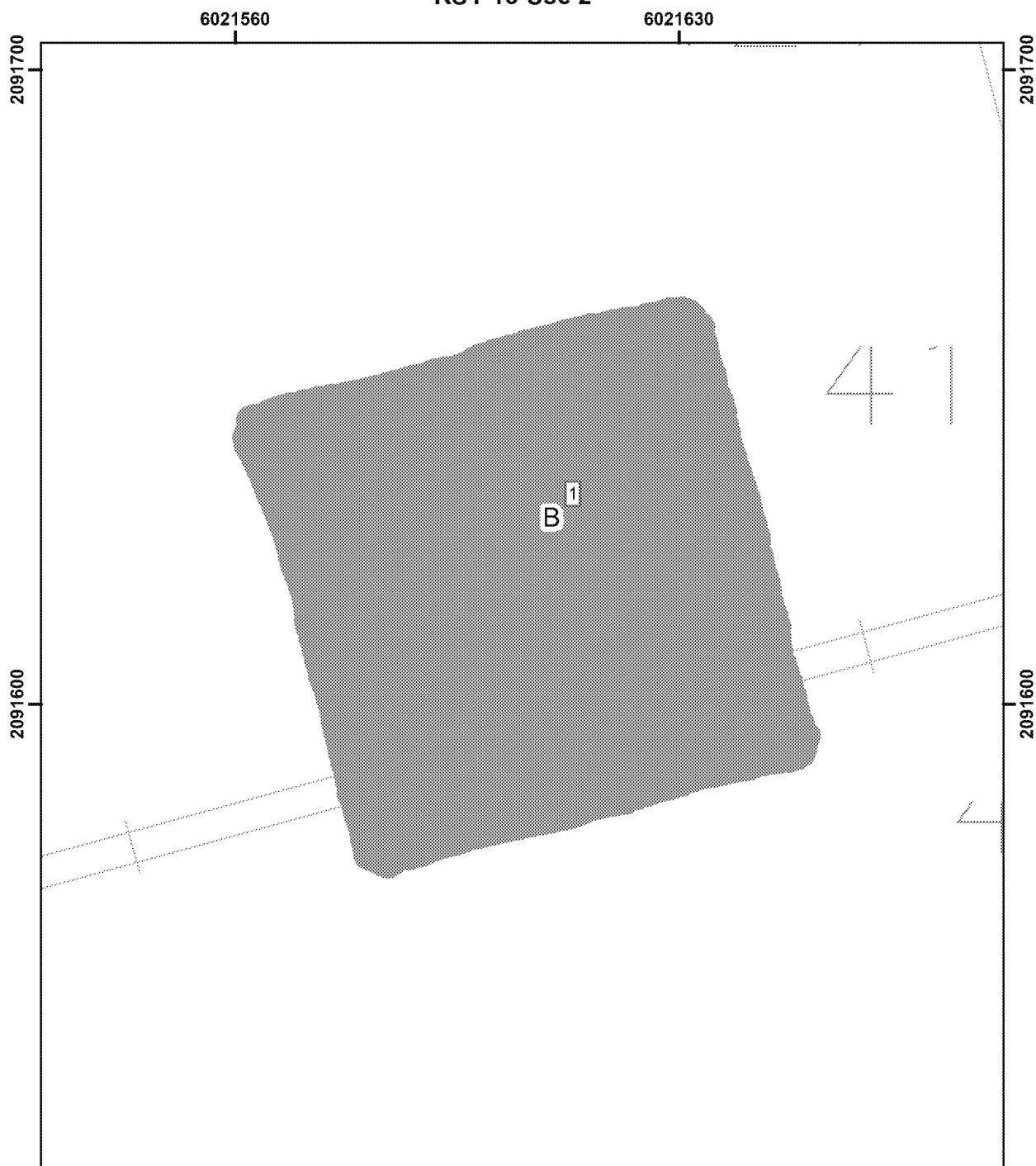


APTIM



Biased Sampling  
HPNS Parcel G  
RSY 15 Use 2

TU-098B SFU



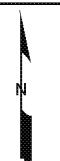
**RSY 15 Use 2**

B Biased Sample Location

● RS-700 GWS Coverage

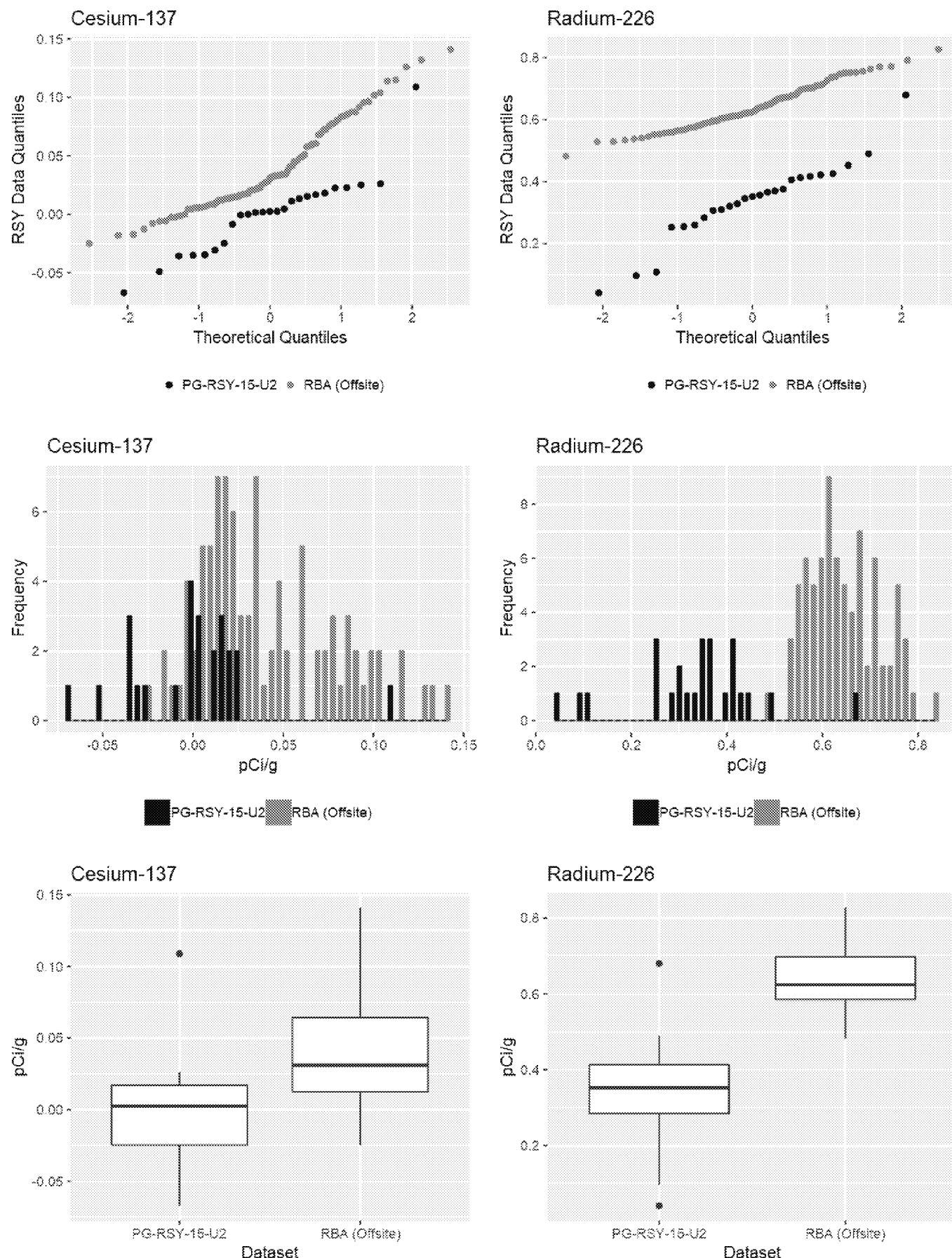
25 12.5 0 25 Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



**APTIM**

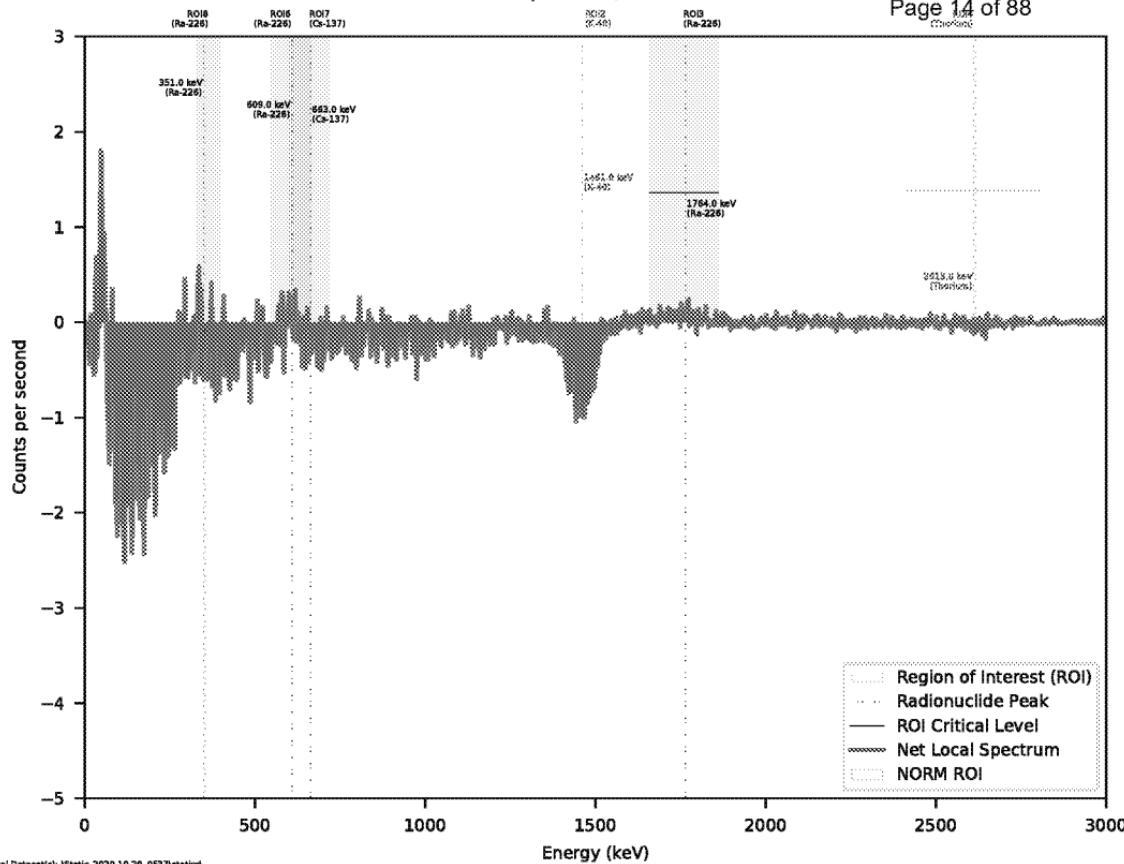
## Soil Sample Statistics





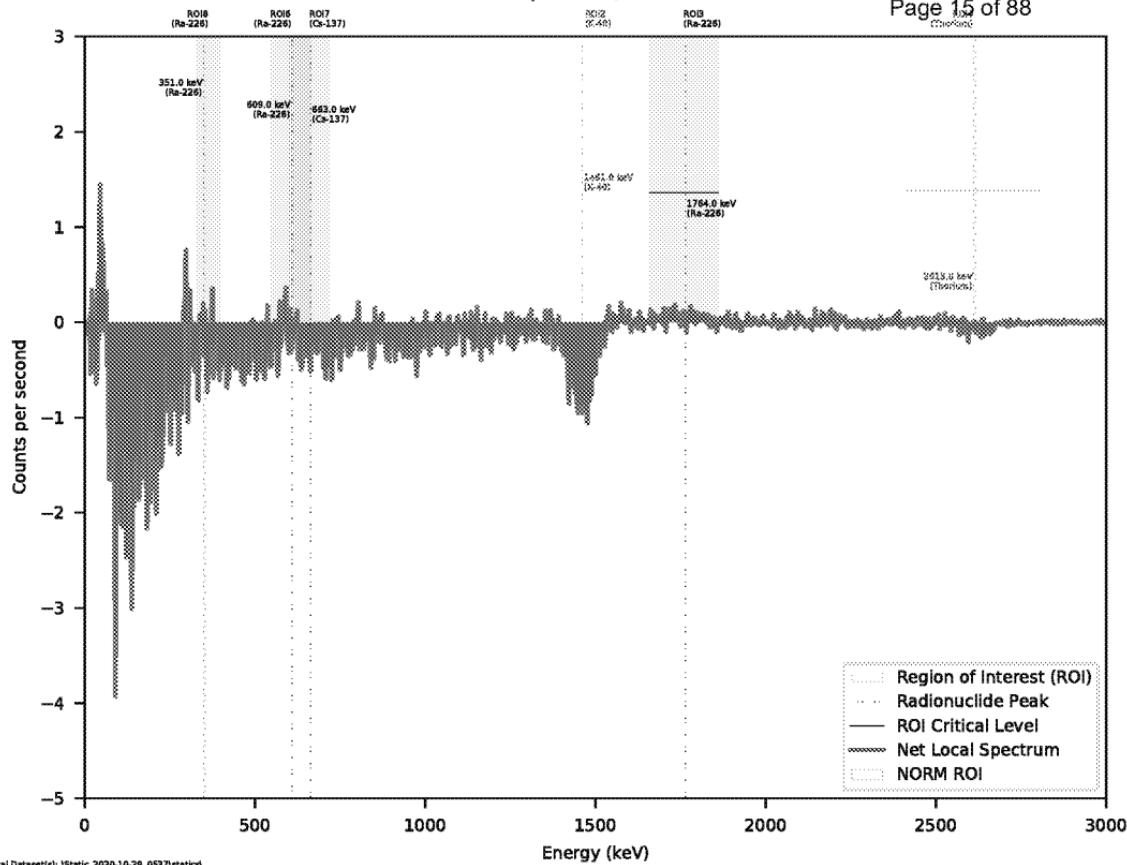
## Net Gamma Spectrum, Static Location: 1

Page 14 of 88



## Net Gamma Spectrum, Static Location: 2

Page 15 of 88



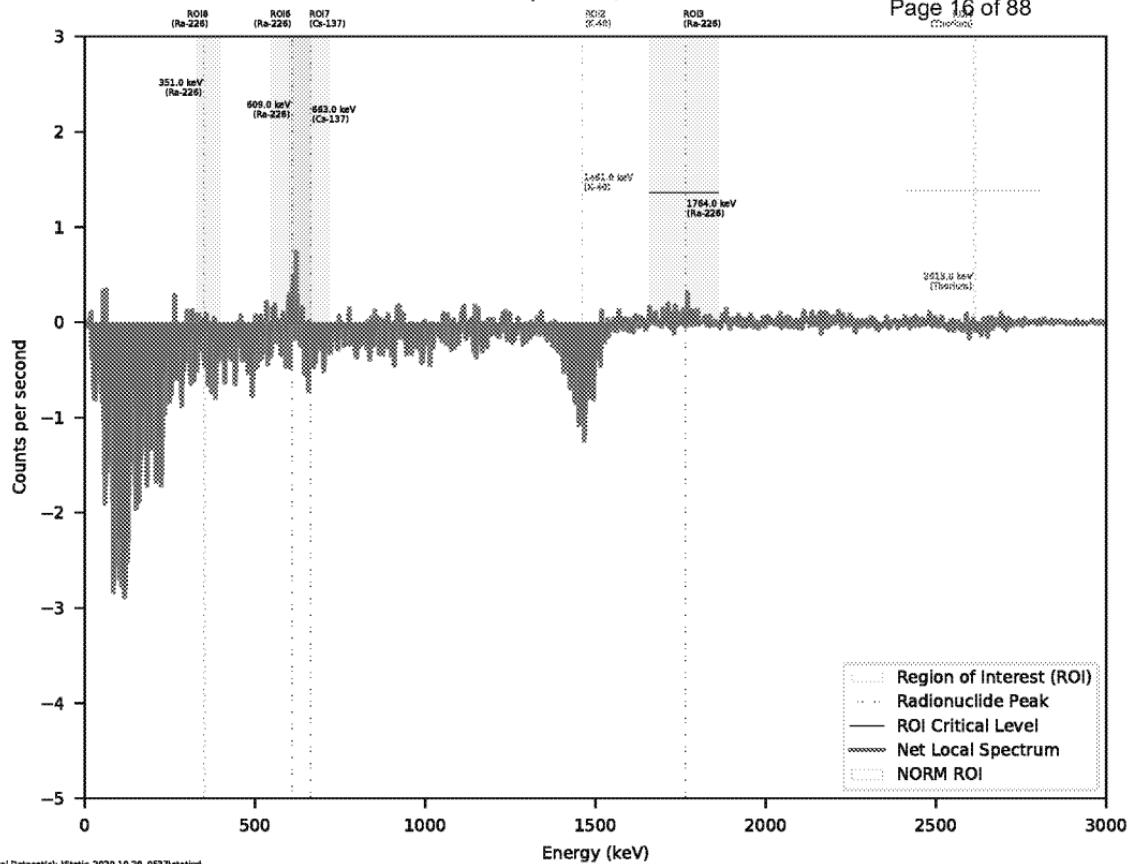
Local Dataset(s): 1Static\_2020-10-29\_0537/static/  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36735860447763, 37.724388923880575

ED\_006360\_00000077-00015

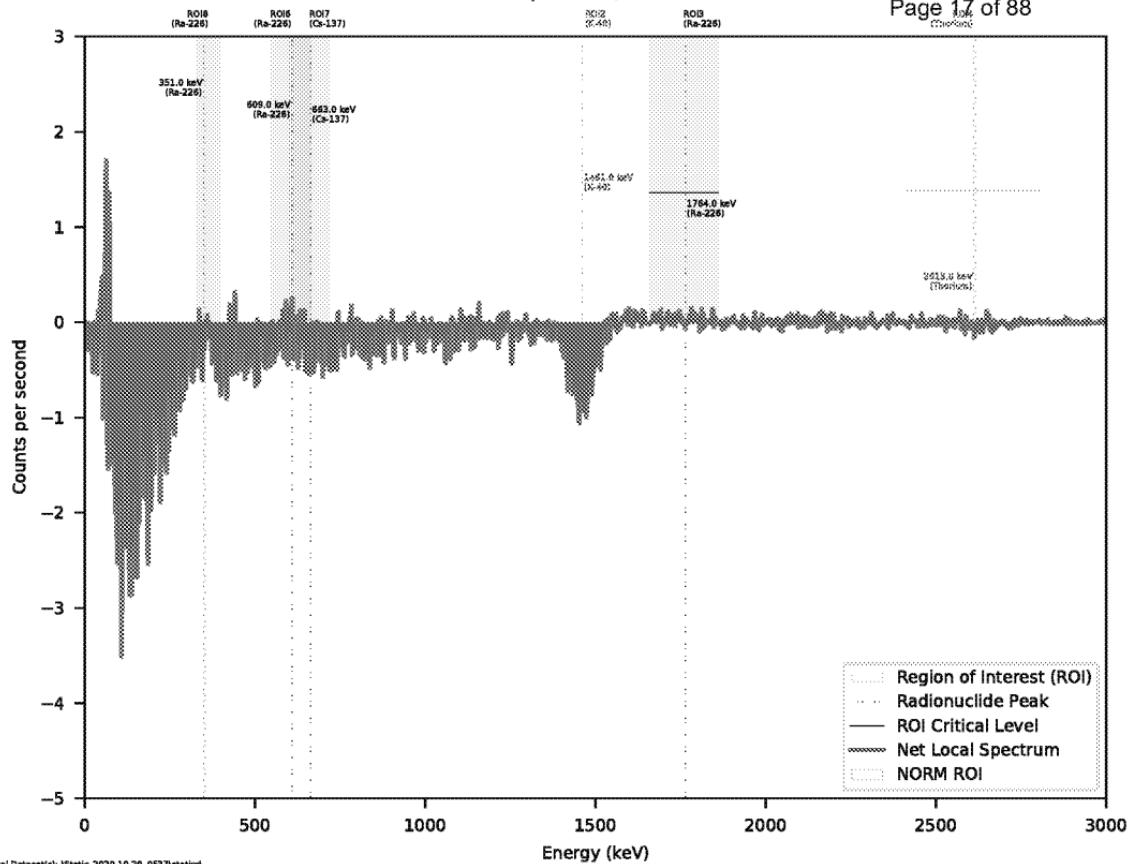
## Net Gamma Spectrum, Static Location: 3

Page 16 of 88



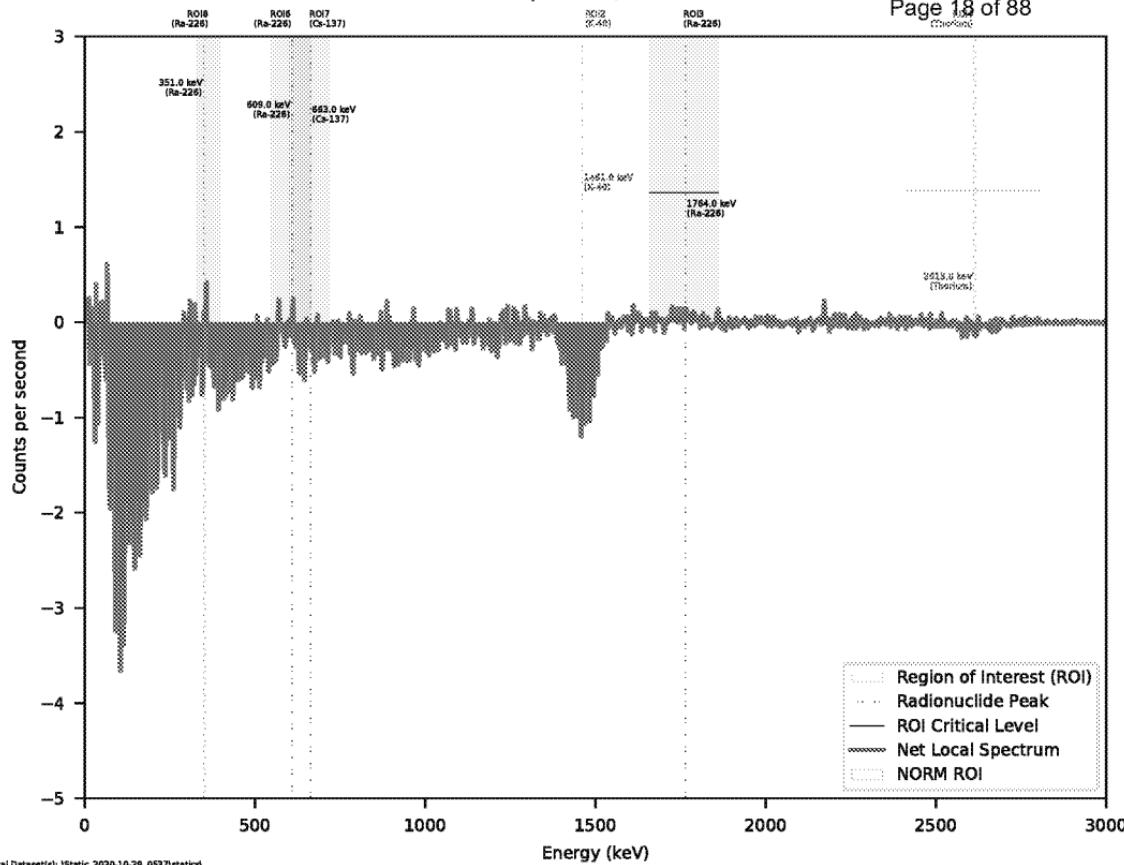
## Net Gamma Spectrum, Static Location: 4

Page 17 of 88



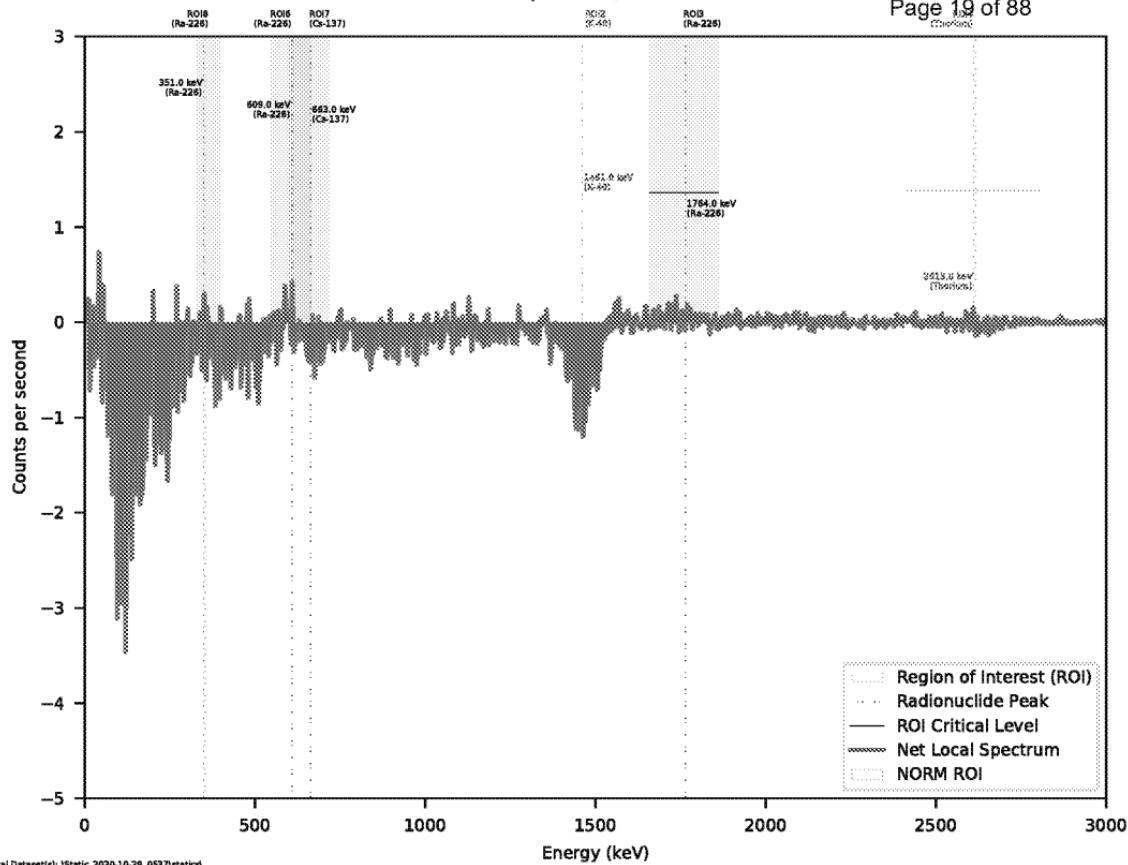
## Net Gamma Spectrum, Static Location: 5

Page 18 of 88



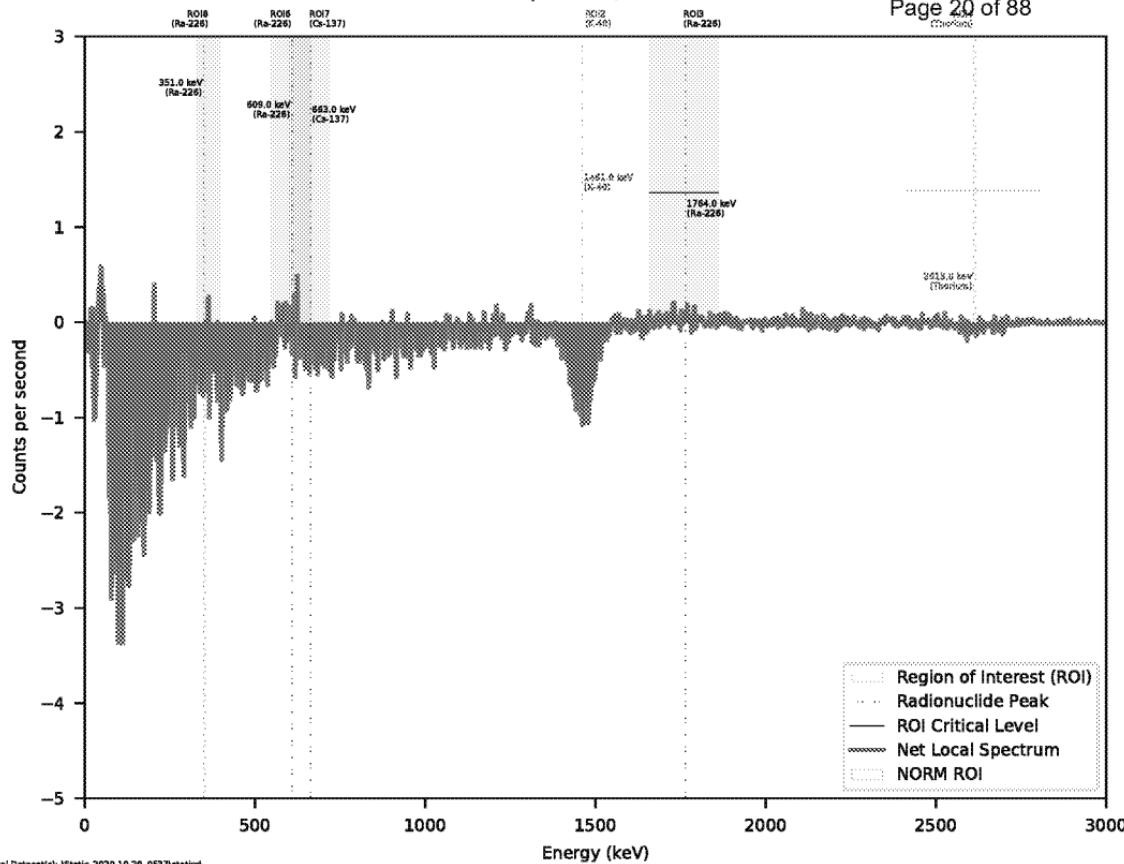
## Net Gamma Spectrum, Static Location: 6

Page 19 of 88



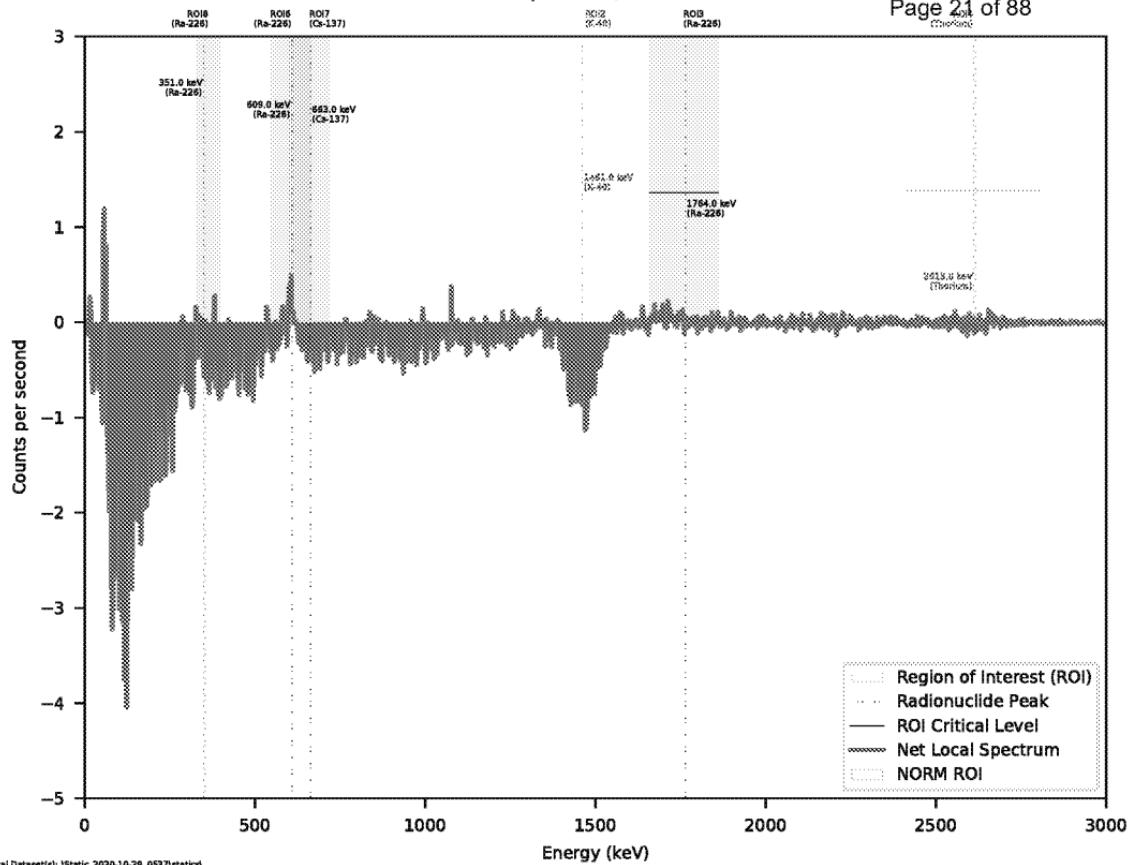
## Net Gamma Spectrum, Static Location: 7

Page 20 of 88



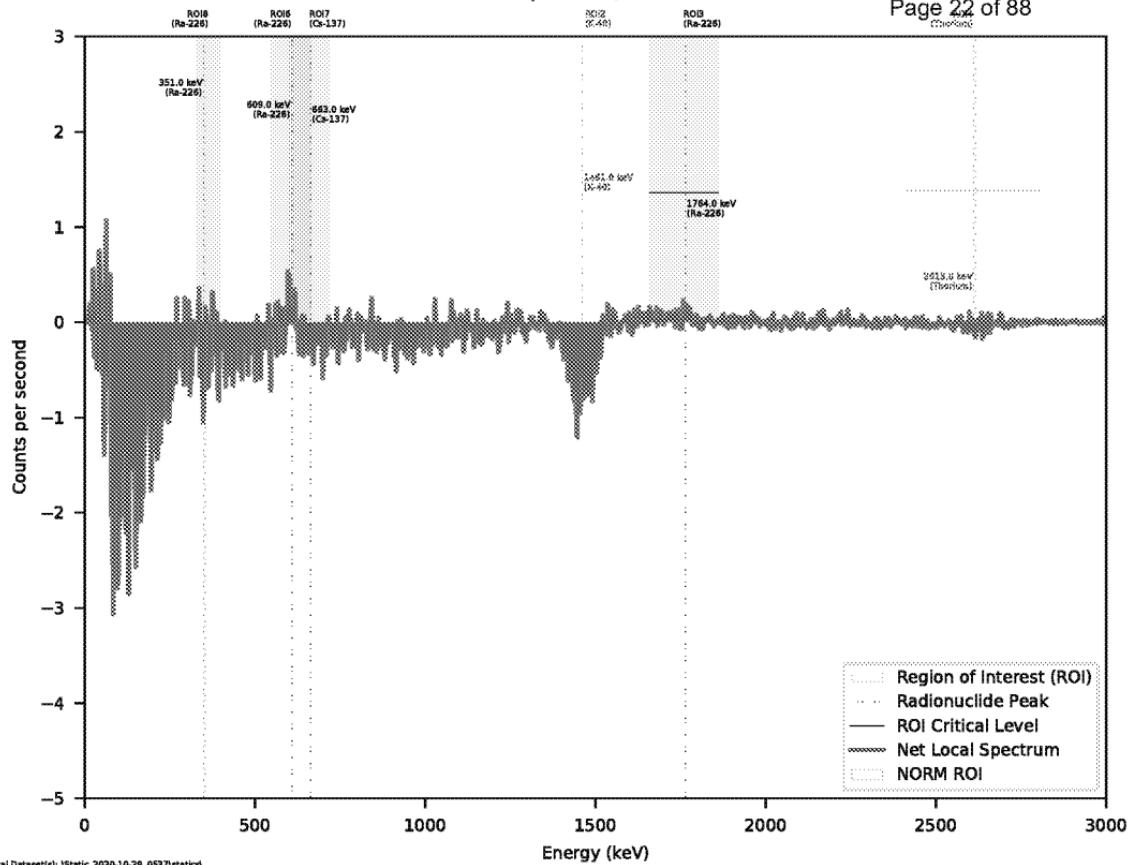
## Net Gamma Spectrum, Static Location: 8

Page 21 of 88



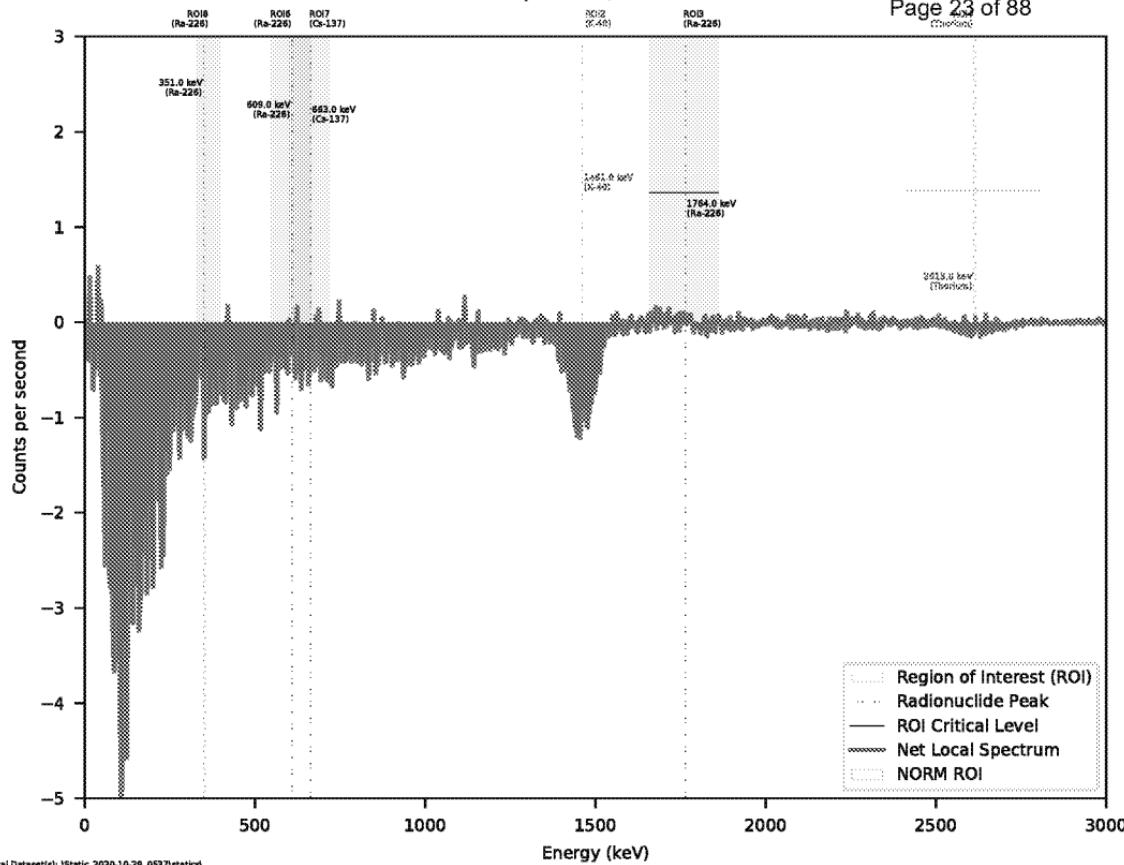
## Net Gamma Spectrum, Static Location: 9

Page 22 of 88



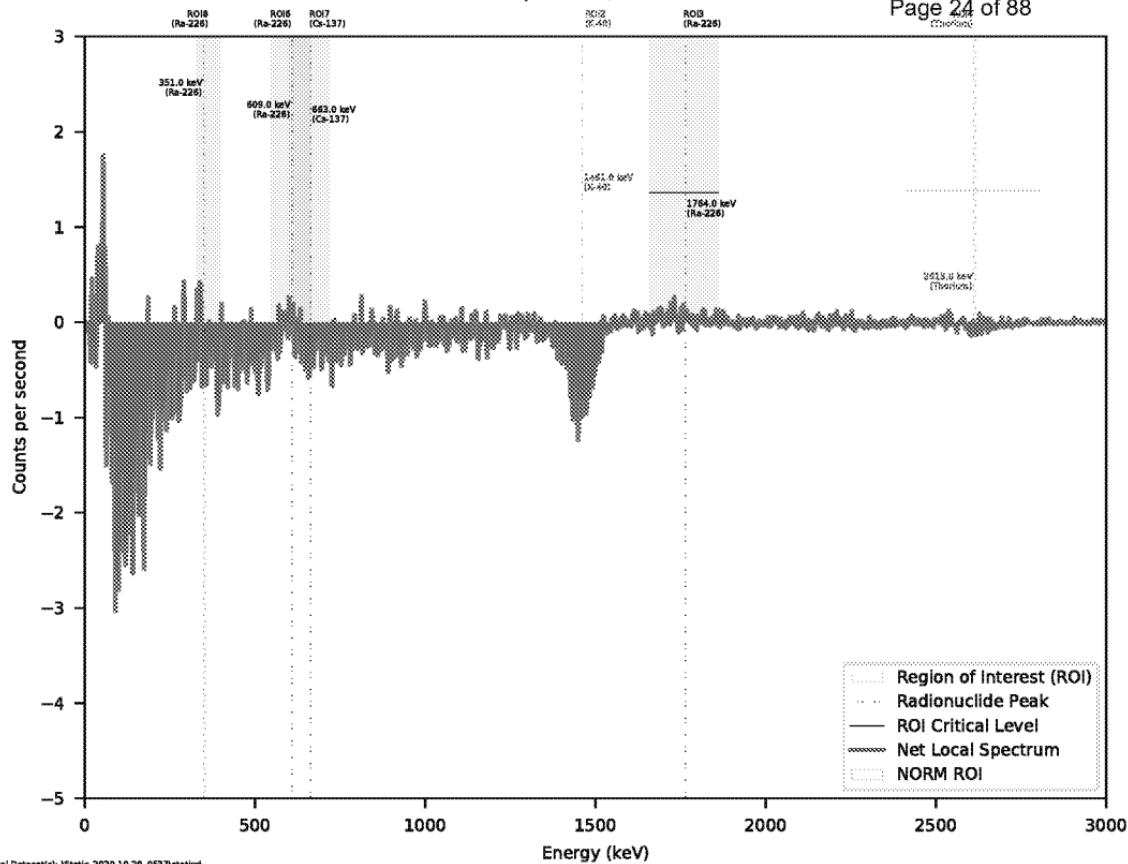
## Net Gamma Spectrum, Static Location: 10

Page 23 of 88



## Net Gamma Spectrum, Static Location: 11

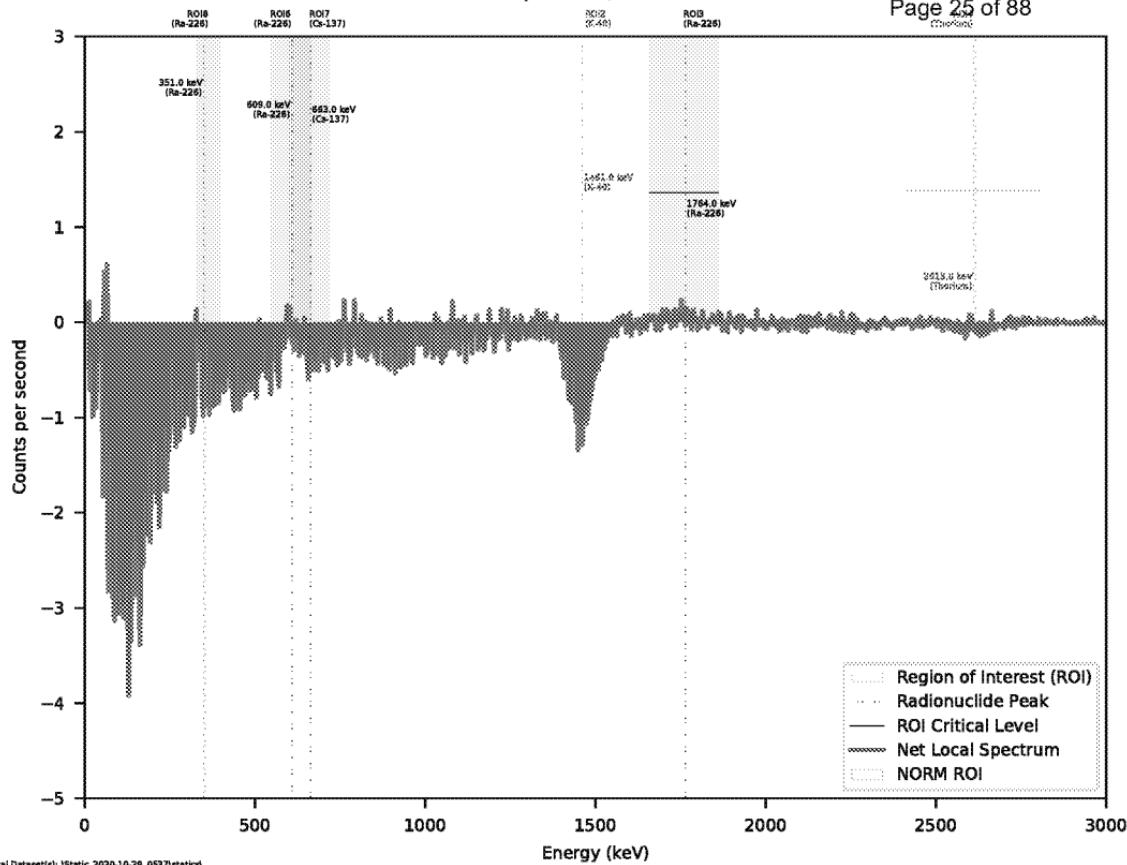
Page 24 of 88



ED\_006360\_00000077-00024

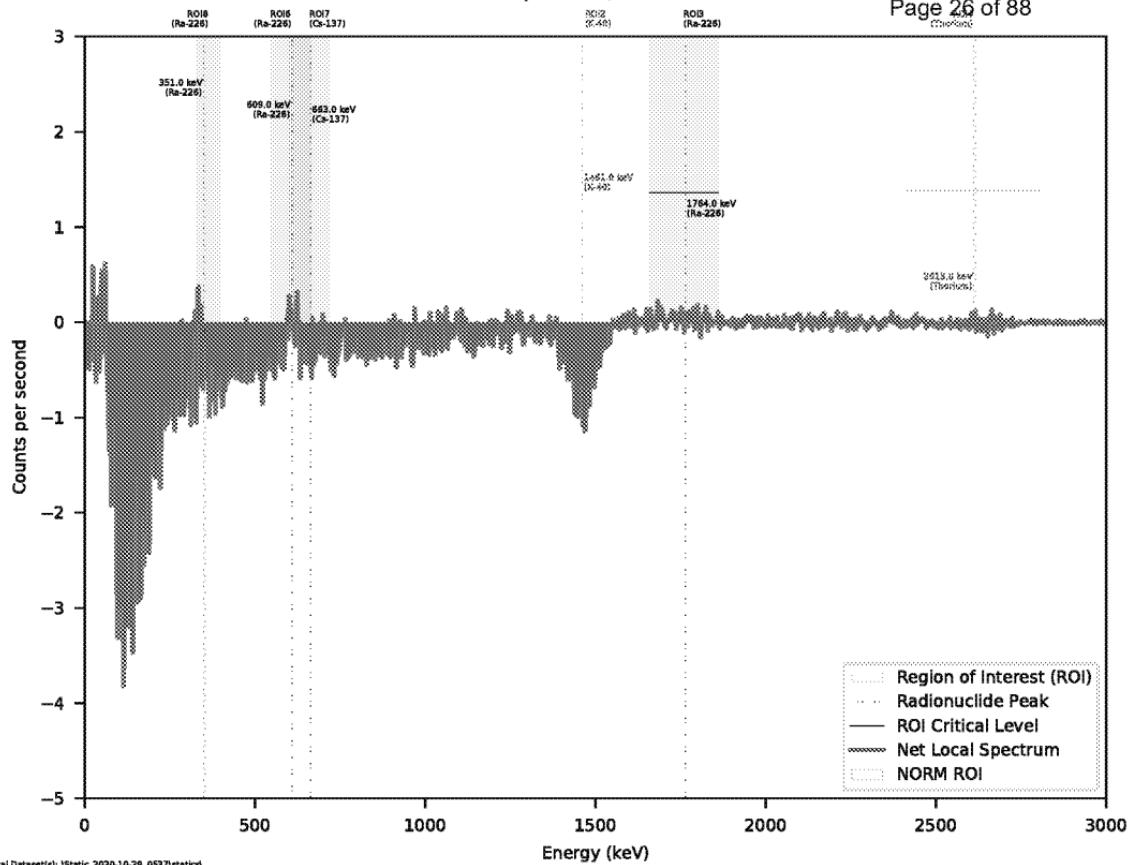
## Net Gamma Spectrum, Static Location: 12

Page 25 of 88



## Net Gamma Spectrum, Static Location: 13

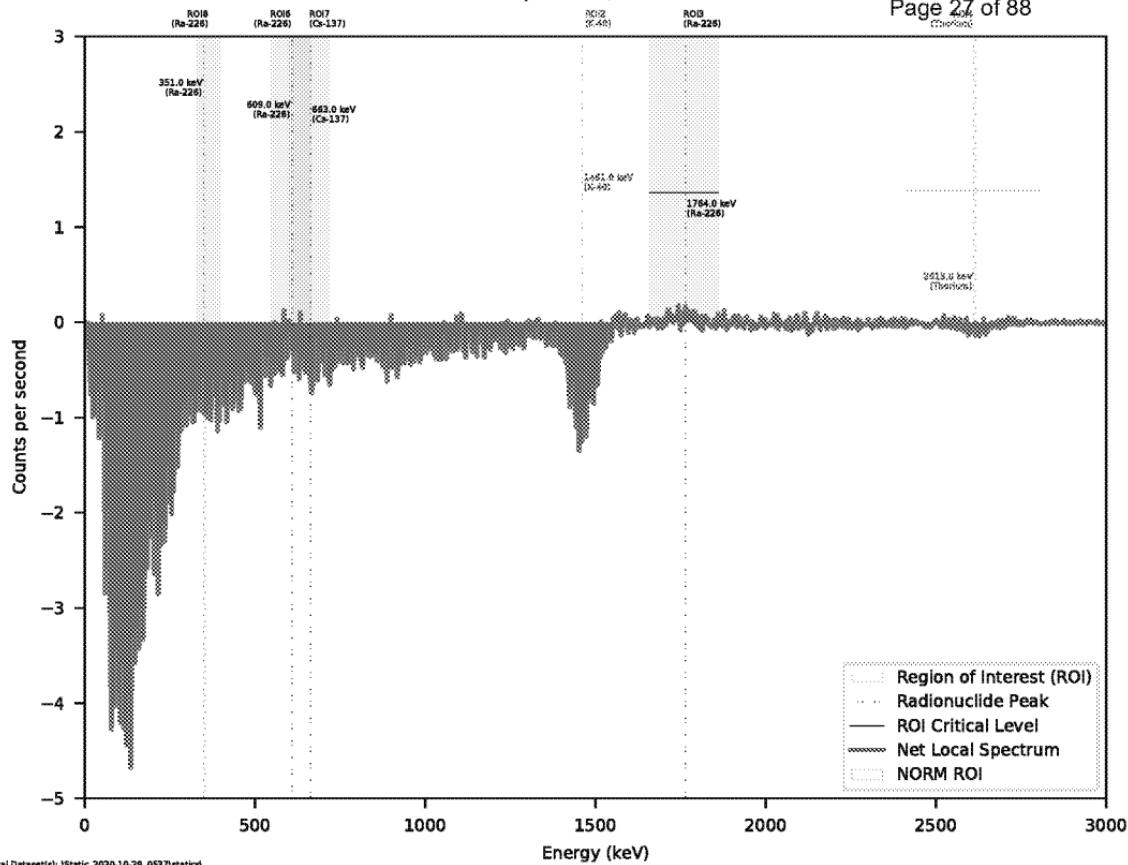
Page 26 of 88



ED\_006360\_00000077-00026

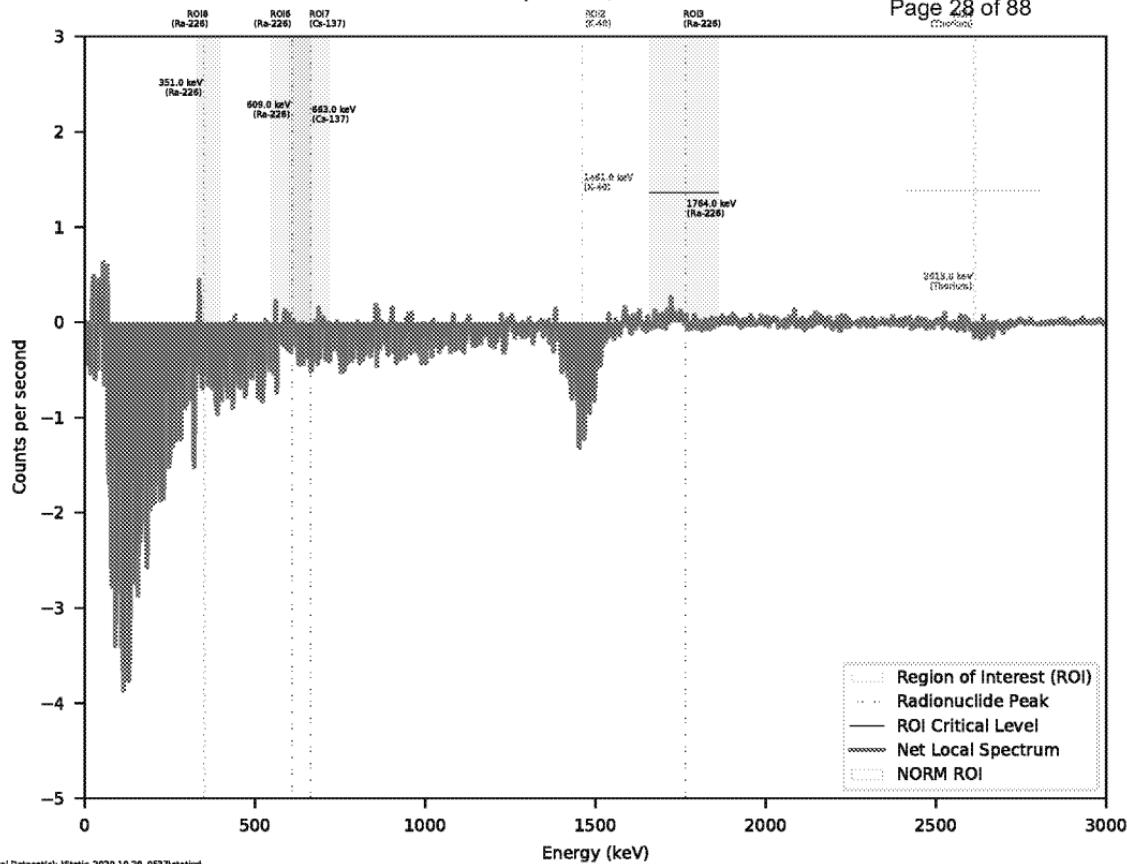
## Net Gamma Spectrum, Static Location: 14

Page 27 of 88



## Net Gamma Spectrum, Static Location: 15

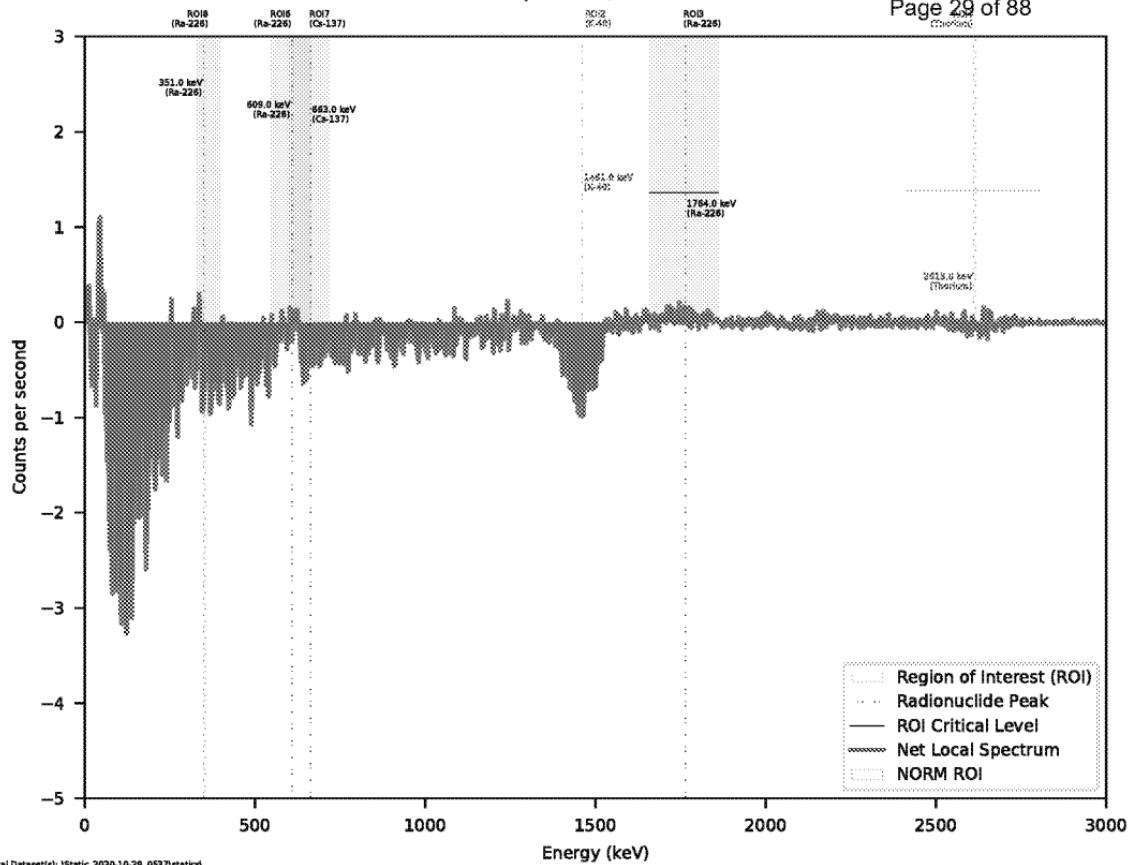
Page 28 of 88



ED\_006360\_00000077-00028

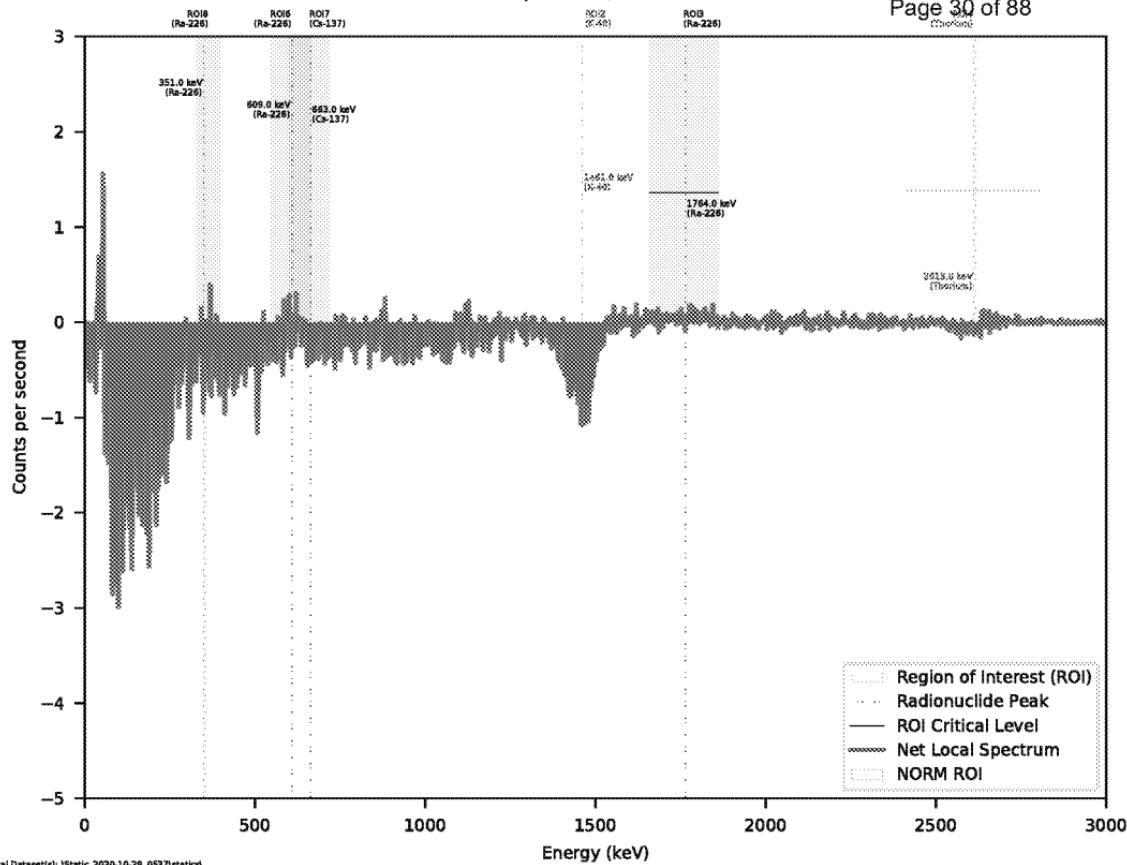
## Net Gamma Spectrum, Static Location: 16

Page 29 of 88



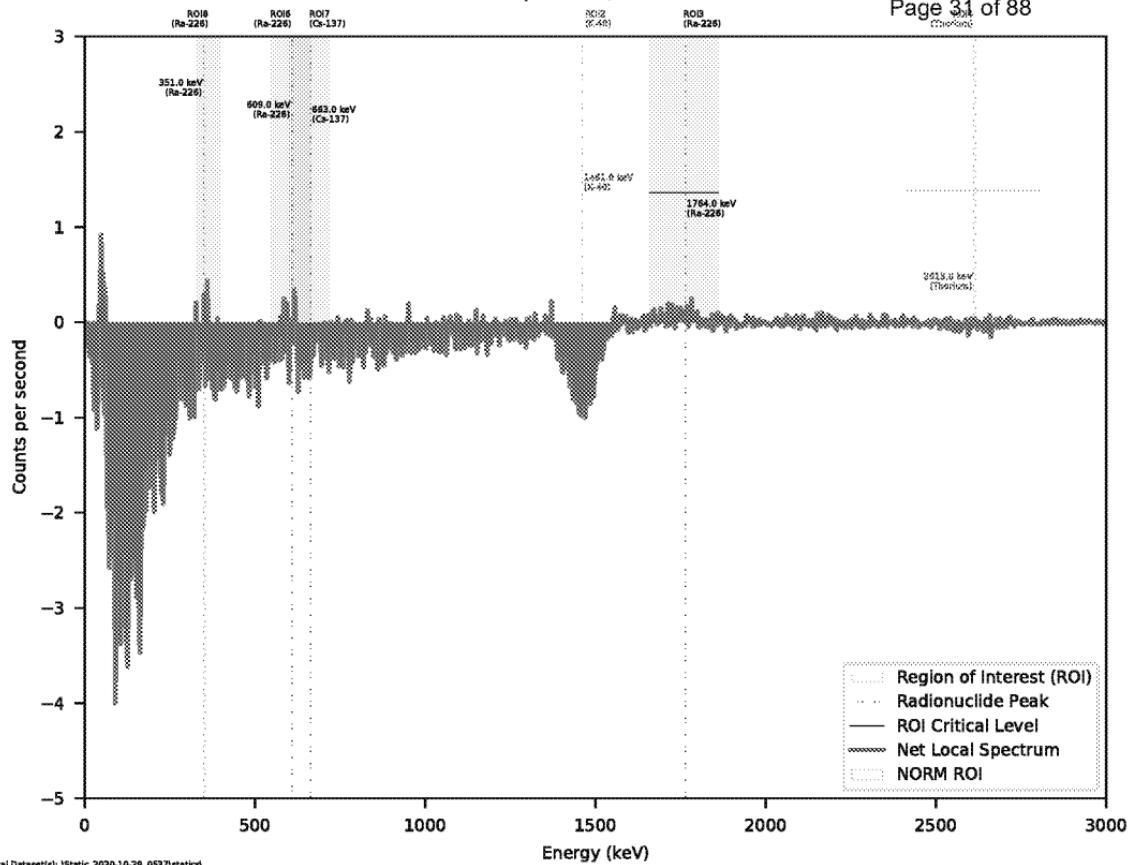
## Net Gamma Spectrum, Static Location: 17

Page 30 of 88



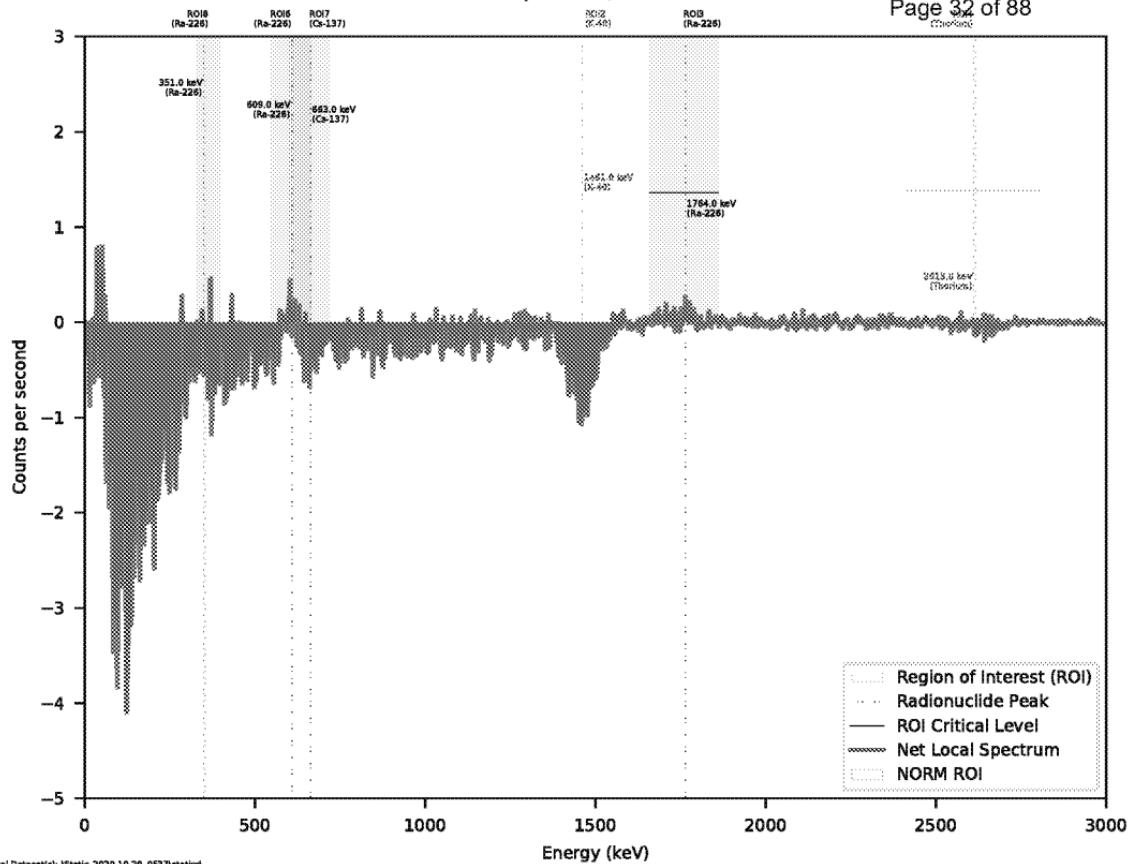
## Net Gamma Spectrum, Static Location: 18

Page 31 of 88



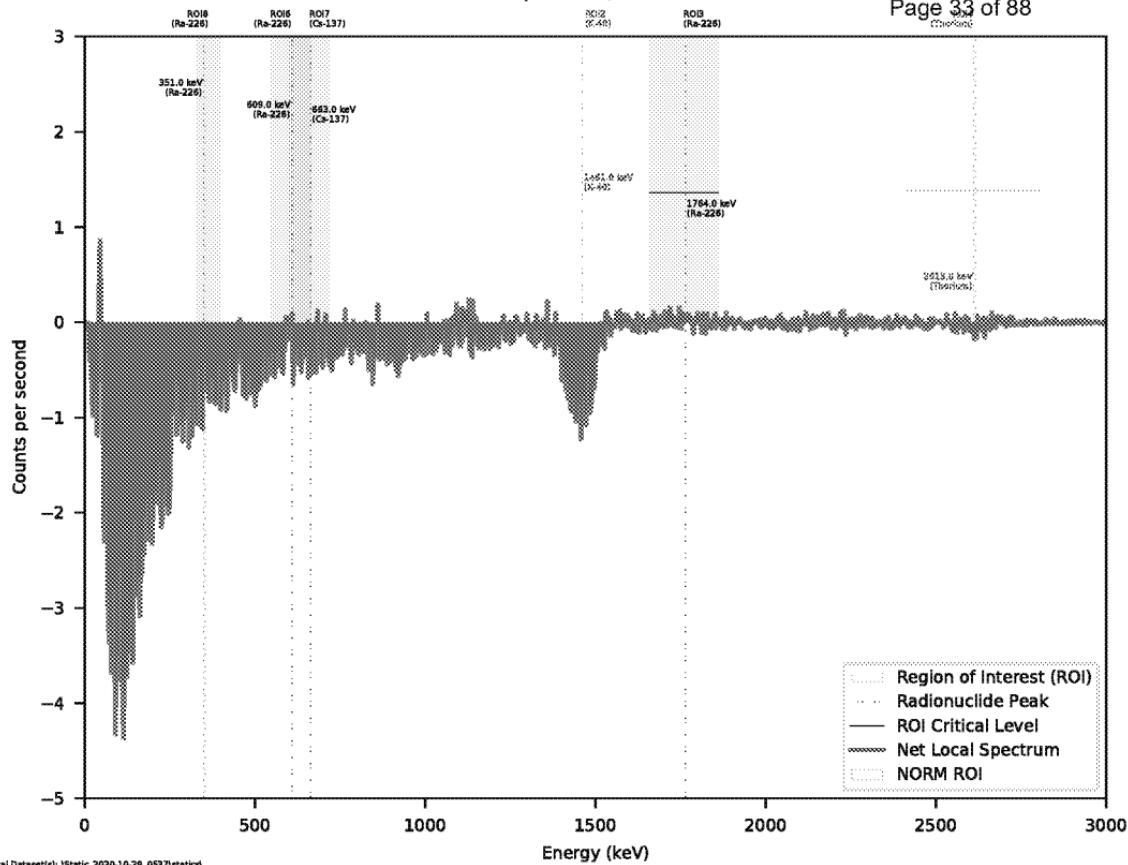
## Net Gamma Spectrum, Static Location: 19

Page 32 of 88



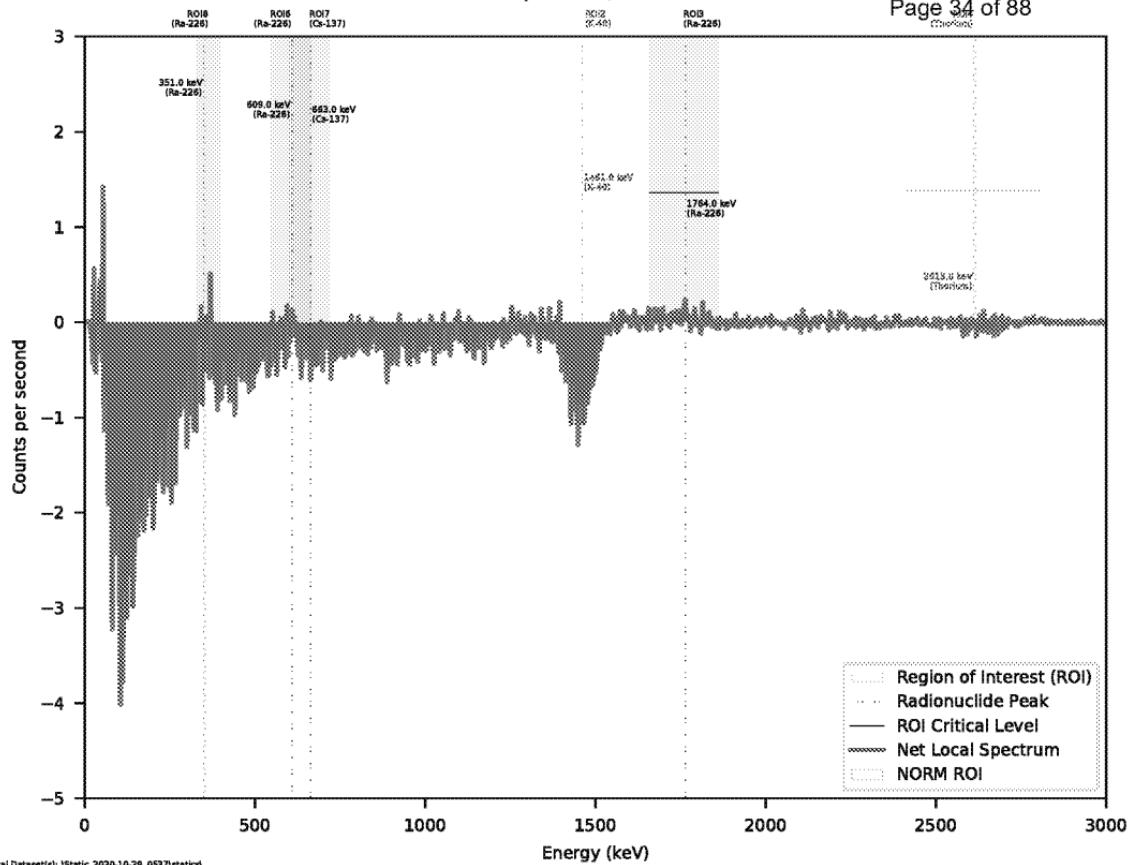
## Net Gamma Spectrum, Static Location: 20

Page 33 of 88



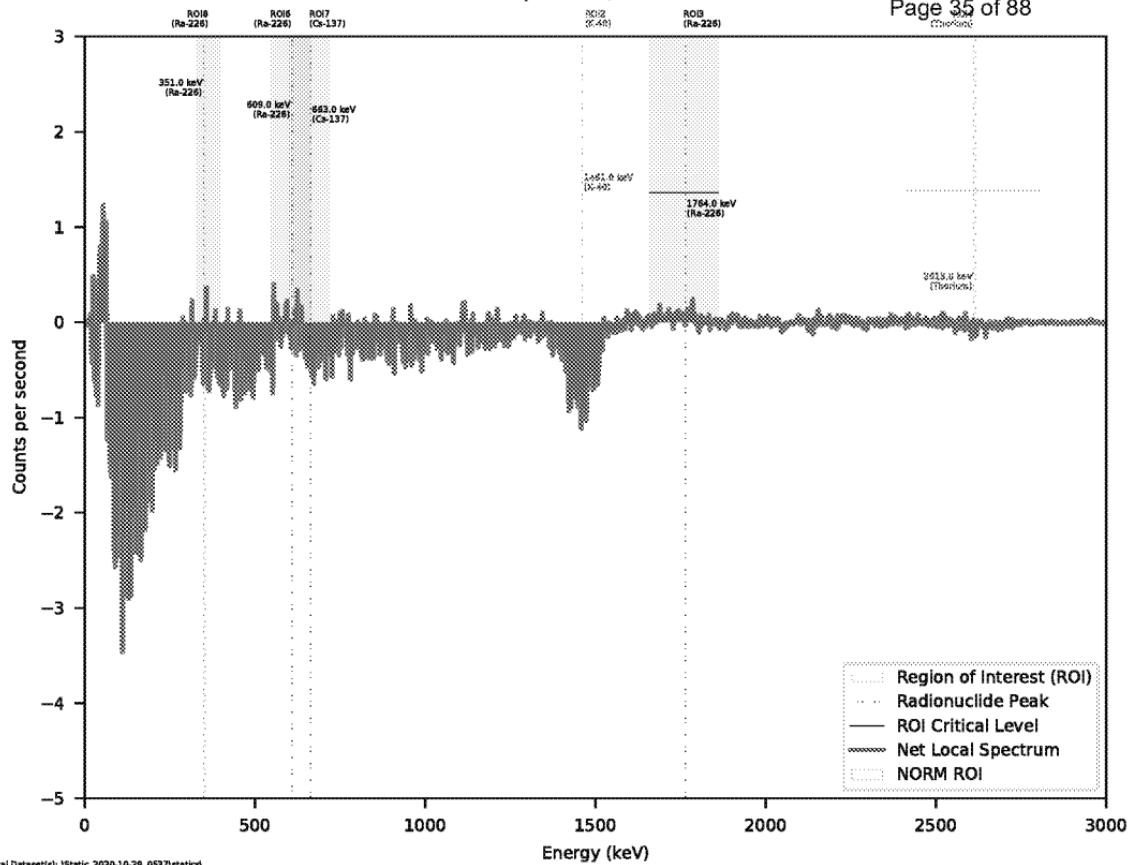
## Net Gamma Spectrum, Static Location: 21

Page 34 of 88



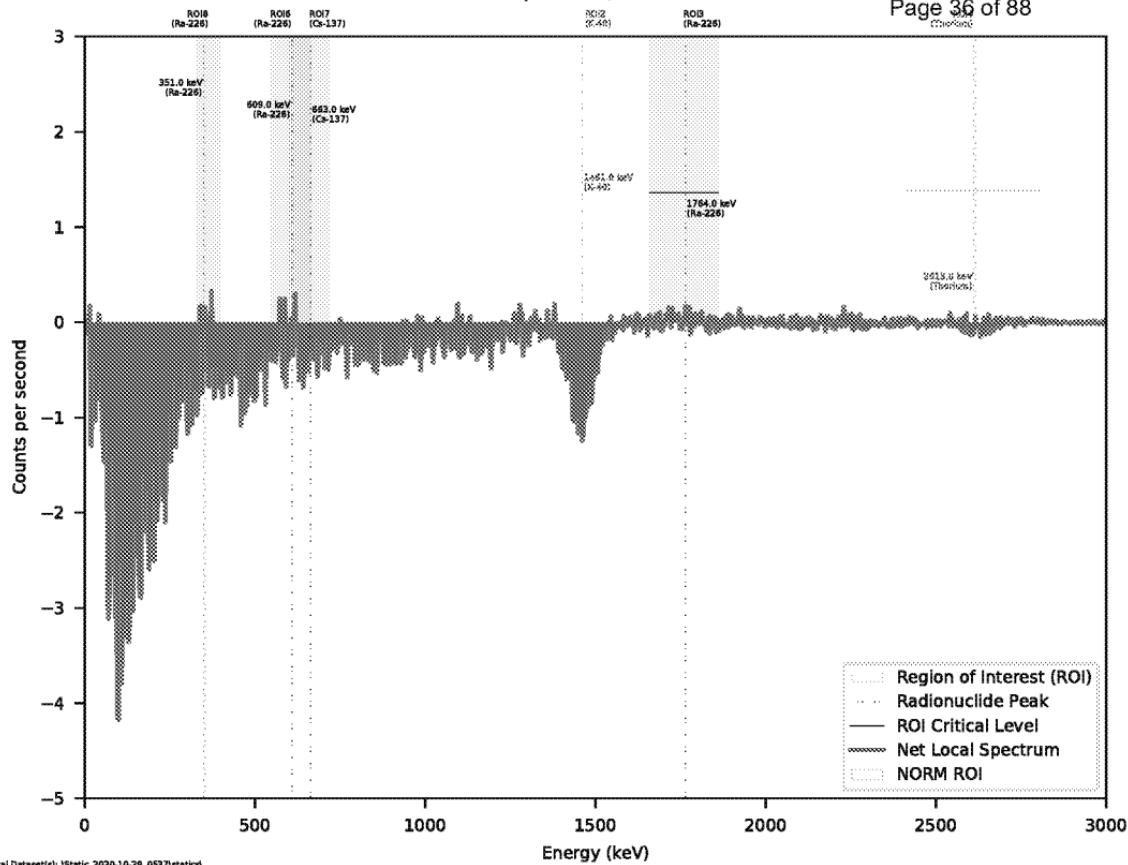
## Net Gamma Spectrum, Static Location: 22

Page 35 of 88



## Net Gamma Spectrum, Static Location: 23

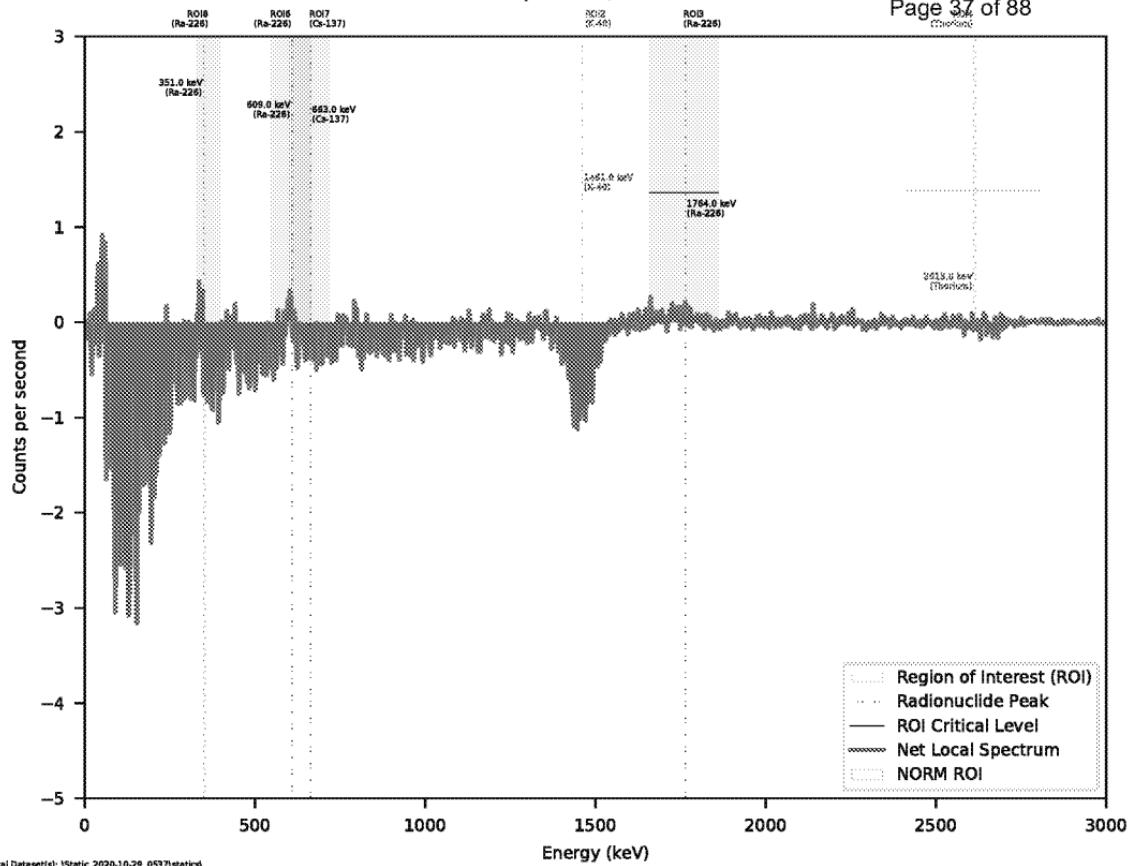
Page 36 of 88



ED\_006360\_00000077-00036

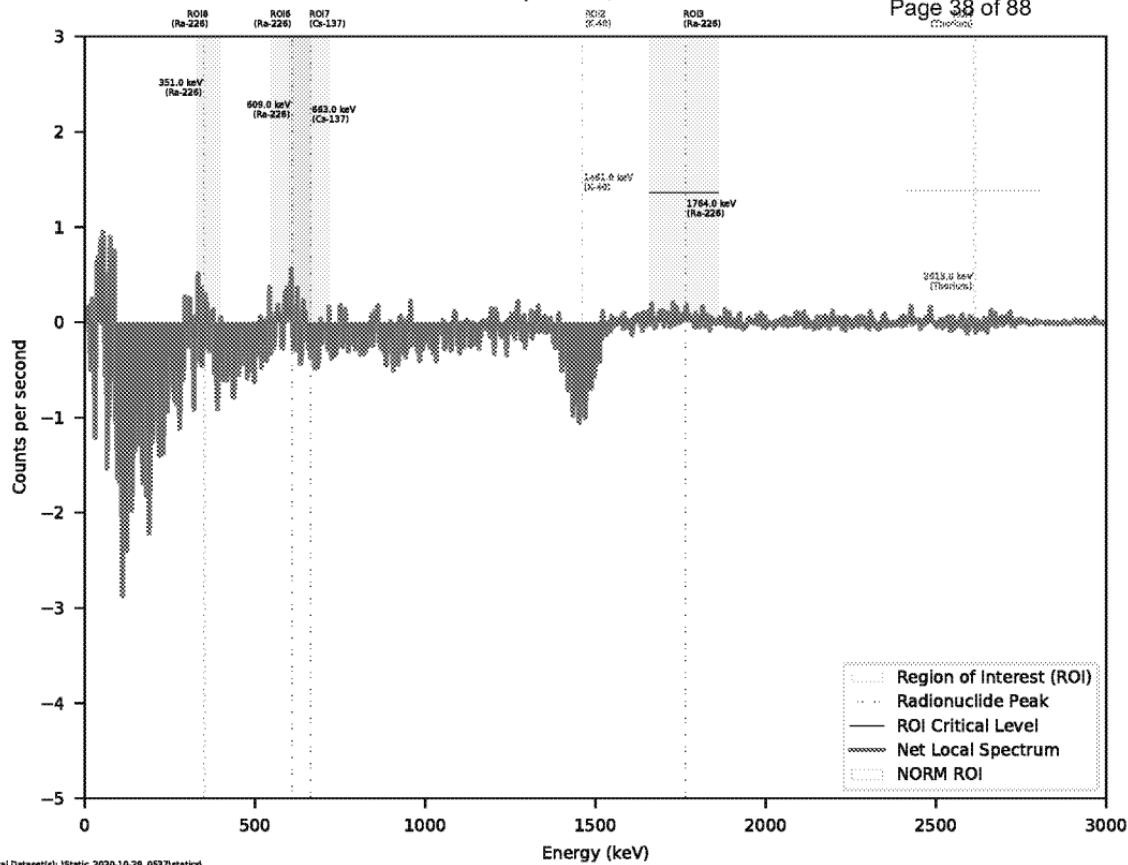
## Net Gamma Spectrum, Static Location: 24

Page 37 of 88



## Net Gamma Spectrum, Static Location: 25

Page 38 of 88





## Environment Testing America

### ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

Laboratory Job ID: 160-40217-1  
Laboratory Sample Delivery Group: GJ46599774  
Client Project/Site: HPNS-Parcel G 501197

For:  
Aptim Federal Services LLC  
4005 Port Chicago Hwy, Suite 200  
Concord, California 94520

Attn: Rose Condit

*Rhonda Ridenhower*

---

Authorized for release by:  
12/16/2020 11:20:43 PM

Rhonda Ridenhower, Client Service Manager  
(314)298-8566  
Rhonda.Ridenhower@Eurofinset.com

#### LINKS

Review your project  
results through

**Total Access**

Have a Question?

Ask—  
The  
Expert

Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Chain of Custody . . . . .	6
Receipt Checklists . . . . .	10
Definitions/Glossary . . . . .	11
Method Summary . . . . .	12
Sample Summary . . . . .	13
Client Sample Results . . . . .	14
QC Sample Results . . . . .	29
QC Association Summary . . . . .	33
Tracer Carrier Summary . . . . .	35

# Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Page 41 of 88

Job ID: 160-40217-1  
SDG: GJ46599774

**Job ID: 160-40217-1**

**Laboratory: Eurofins TestAmerica, St. Louis**

**Narrative**

## CASE NARRATIVE

**Client: Aptim Federal Services LLC**

**Project: HPNS-Parcel G 501197**

**Report Number: 160-40217-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### **RECEIPT**

The samples were received on 11/02/2020; the samples arrived in good condition, properly preserved. The temperature of the coolers at

# Case Narrative

Page 42 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

## Job ID: 160-40217-1 (Continued)

### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

receipt was 16.9 C.

#### **TOTAL BETA STRONTIUM (GFPC)**

Samples HPPG-F-025 (160-40217-1), HPPG-SFU-TU098B-001 (160-40217-3), HPPG-SFU-TU098B-011 (160-40217-13) and HPPG-SFU-TU098B-021 (160-40217-23) were analyzed for Total Beta Strontium (GFPC) in accordance with EPA 905. The samples were dried on 11/04/2020, prepared on 11/25/2020 and analyzed on 12/11/2020.

The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: HPPG-SFU-TU098B-011 (160-40217-13), HPPG-SFU-TU098B-021 (160-40217-23) and (160-40217-A-13-A DU). The samples contained rocks of varying sizes.

The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: HPPG-F-025 (160-40217-1) and HPPG-SFU-TU098B-001 (160-40217-3). The samples contained rocks of varying sizes.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)**

Samples HPPG-F-025 (160-40217-1), HPPG-F-026 (160-40217-2), HPPG-SFU-TU098B-001 (160-40217-3), HPPG-SFU-TU098B-002 (160-40217-4), HPPG-SFU-TU098B-003 (160-40217-5), HPPG-SFU-TU098B-004 (160-40217-6), HPPG-SFU-TU098B-005 (160-40217-7), HPPG-SFU-TU098B-006 (160-40217-8), HPPG-SFU-TU098B-007 (160-40217-9), HPPG-SFU-TU098B-008 (160-40217-10), HPPG-SFU-TU098B-009 (160-40217-11), HPPG-SFU-TU098B-010 (160-40217-12), HPPG-SFU-TU098B-011 (160-40217-13), HPPG-SFU-TU098B-012 (160-40217-14), HPPG-SFU-TU098B-013 (160-40217-15), HPPG-SFU-TU098B-014 (160-40217-16), HPPG-SFU-TU098B-015 (160-40217-17), HPPG-SFU-TU098B-016 (160-40217-18), HPPG-SFU-TU098B-017 (160-40217-19), HPPG-SFU-TU098B-018 (160-40217-20), HPPG-SFU-TU098B-019 (160-40217-21), HPPG-SFU-TU098B-020 (160-40217-22), HPPG-SFU-TU098B-021 (160-40217-23), HPPG-SFU-TU098B-022 (160-40217-24), HPPG-SFU-TU098B-023 (160-40217-25), HPPG-SFU-TU098B-024 (160-40217-26) and HPPG-SFU-TU098B-025 (160-40217-27) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 11/04/2020, prepared on 11/06/2020 and analyzed on 11/29/2020.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

#### Inferred from      Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

## Case Narrative

Page 43 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

### Job ID: 160-40217-1 (Continued)

#### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

Gamma Prep Batch 488492

The cesium-137 detection goal of 0.0700 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.  
HPPG-SFU-TU098B-022 (160-40217-24).

The method blank (MB) Z-score is within limits and is located in the level IV raw data. (MB 160-488492/1-A)

Gamma prep batch 488491

The method blank (MB) z-score is within limits and is stored in the level IV raw data. (MB 160-488491/1-A)

The cesium-137 detection goal of 0.0700 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.  
HPPG-SFU-TU098B-001 (160-40217-3), (HPPG-SFU-TU098B-016 (160-40217-18).

The replicate precision for Bi-212 associated with Prep Batch 160-488207 and 160-488491 does not meet QC criteria. This appears to be random in nature, and limited deviations such as this are statistically expected when larger analyte lists are reported. Such excursions are often caused by fluctuations in Compton background, force-fitting of peaks that are not found by the software peak-search algorithm, and inclusion of inferior peak results by the software in weighted averages. The laboratory SOP allows for such statistical exceedances. (160-40217-A-20-C DU).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



APTIM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520Project Manager: Lisa Bercik  
Phone #: (619)213-3389Send Report to: Rose Condit  
Phone/Fax Number: 415-987-0760  
Address: 4005 Port Chicago Hwy

Sample Lead: Lewis, Devin

Sample Tech(s): Andrew Murri  
Paul LeBlanc

## CHAIN OF CUSTODY

Ref. Document # 501197RSY-023

Page 1 of 4

				Analysis Requested							
Project Number:	501197			Hunters Point Naval Shipyard: Parcel G Remedial Action							
Project Name:											
Project Location:	San Francisco, CA										
Purchase Order #:	11S9058										
Shipment/Pickup Date:	10/30/2020										
Waybill Number:	495702254307										
Lab Destination:	Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046										
Lab Contact Name/ph #				Rhoeda Ridenbower (314)298-8566	Strontium-90 (EPA 901-1 M)	Caesium-137 (EPA 901-1 M)	Dose Rate uR/Hr	Evidence Bag ID	Comment		
	Collection Information			Preservatives	Preservatives (soil)	Container Type					
Sample ID	Date	Time	Method	Matrix	# of Containers						
HPPG-F-025	10/29/2020	14:29	G	SO	1	16 oz. plastic jar	X	X	5	GJ46599774	
HPPG-F-026	10/29/2020	14:57	G	SO	1	16 oz. plastic jar	X		5	GJ46599774	
HPPG-SFU-TU098B-001	10/29/2020	13:52	G	SO	1	16 oz. plastic jar	X	X	5	GJ46599774	
HPPG-SFU-TU098B-002	10/29/2020	13:56	G	SO	1	16 oz. plastic jar	X		5	GJ46599774	
HPPG-SFU-TU098B-003	10/29/2020	14:01	G	SO	1	16 oz. plastic jar	X		5	GJ46599774	
HPPG-SFU-TU098B-004	10/29/2020	14:05	G	SO	1	16 oz. plastic jar	X		5	GJ46599774	
HPPG-SFU-TU098B-005	10/29/2020	14:08	G	SO	1	16 oz. plastic jar	X		5	GJ46599774	
HPPG-SFU-TU098B-006	10/29/2020	14:11	G	SO	1	16 oz. plastic jar	X		5	GJ46599774	
Special Instructions:				21 day ingrowth results only Analyze for Total Strontium as a screening step, and isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g							
Turnaround Time: 3-day <input type="checkbox"/> 10-Day <input type="checkbox"/> 28-day <input type="checkbox"/> Other <input type="checkbox"/>				Level of QC Required: I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> Project Specific							
Method Codes C = Composite G = Grab Matrix Codes: DW = Drinking Water; So = Soil; GW = Ground Water; SL = Sludge; WW = Waste Water; CP = Chip Samples; A = Air; ABS = Asbestos; PO = Pipe Opening											
Relinquished By:	Relinquisher Signature:		Relinquish Date Time:		Received By:		Received Signature:		Receive Date Time:		
Lewis, Devin			10/29/2020 15:55		Locked Storage (RKillpack)				10/29/2020 15:55		
Locked Storage (RKillpack)			10/30/2020 15:39		Devin Lewis				10/30/2020 15:39		
Devin Lewis			10/30/2020 15:42		SHIPPEDTOOLAB		FED EX				

\*\*\* Last 3 transfers shown above - Complete list of transfers on last page \*\*\*

FED EX

160-40217 Chain of Custody

MICHAEL KORRIN HICKEY NOV 03 2020 08150



APTIM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520

## CHAIN OF CUSTODY

Ref. Document # 501197RSY-023

Page 2 of 4

Project Manager: Lisa Bercik  
Phone #: (619)213-3389Send Report to: Rose Condit  
Phone/Fax Number: 415-987-0760  
Address: 4005 Port Chicago Hwy  
City Concord, CA 94520

Sample Lead: Lewis, Devin

Sample Tech(s): Andrew Murri  
Paul LeBlanc

Sample ID	Collection Information											
	Date	Time	Method	Matrix								
	# Containers	# of Samples	Preservatives									
HPPG-SFU-TU098B-007	10/29/2020	14:14	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	
HPPG-SFU-TU098B-008	10/29/2020	14:18	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	
HPPG-SFU-TU098B-009	10/29/2020	14:22	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	
HPPG-SFU-TU098B-010	10/29/2020	14:26	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	
HPPG-SFU-TU098B-011	10/29/2020	14:29	G	SO	1	16 oz. plastic jar	X	X		5	GJ46599774	
HPPG-SFU-TU098B-012	10/29/2020	14:32	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	
HPPG-SFU-TU098B-013	10/29/2020	14:34	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	
HPPG-SFU-TU098B-014	10/29/2020	14:36	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	
HPPG-SFU-TU098B-015	10/29/2020	14:38	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	
HPPG-SFU-TU098B-016	10/29/2020	14:41	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	
HPPG-SFU-TU098B-017	10/29/2020	14:42	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	
HPPG-SFU-TU098B-018	10/29/2020	14:44	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	
HPPG-SFU-TU098B-019	10/29/2020	14:46	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	
HPPG-SFU-TU098B-020	10/29/2020	14:46	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	
HPPG-SFU-TU098B-021	10/29/2020	14:48	G	SO	1	16 oz. plastic jar	X	X		5	GJ46599774	
HPPG-SFU-TU098B-022	10/29/2020	14:50	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	
HPPG-SFU-TU098B-023	10/29/2020	14:53	G	SO	1	16 oz. plastic jar	X			5	GJ46599774	

Project Number:	Analysis Requested											Comment
	Hunters Point Naval Shipyard; Parcel G Remedial Action		San Francisco, CA		Purchase Order #: 1159058		Shipment/Pickup Date: 10/30/2020		Waybill Number: 4957 0225 4207		Lab Destination: Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046	
Sample Spec (EPA 8011 M - EPA 21)	Sample Name	Spec 90 (EPA 905 MWD)	Spec 90 (EPA 905 MWD)	Spec 90 (EPA 905 MWD)	Spec 90 (EPA 905 MWD)	Spec 90 (EPA 905 MWD)	Spec 90 (EPA 905 MWD)	Dose Rate uR/Hr	Evidence Bag ID			
Rhoeda Ridenbower (314)298-8566												



# CHAIN OF CUSTODY

Ref. Document # 501197RSY-023

Page 3 of 4

APTIM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520Project Manager: Lisa Bercik  
Phone #: (619)213-3389Send Report to: Rose Condit  
Phone/Fax Number: 415-987-0700  
Address: 4005 Port Chicago Hwy  
City: Concord, CA 94520

Sample Lead: Lewis, Devin

Sample Tech(s): Andrew Murn  
Paul LeBlanc

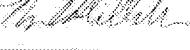
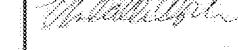
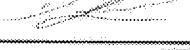
Collection Information			
Sample ID	Date	Time	Method
HPPG-SFU-TU098B-024	10/29/2020	14:54	G
HPPG-SFU-TU098B-025	10/29/2020	14:57	G

		Analysis Requested												
		Hunters Point Naval Shipyard: Parcel G Remedial Action			San Francisco, CA									
		Purchase Order #:	1169058	Shipment/Pickup Date:	10/30/2020	Waybill Number:	4957 0225 4387	Carryin Spec (EPA 901.1, MI - Full 21 day in ground Gamma)	Storage 90 (EPA 905 MDD)	Dose Rate uR/Hr	Evidence Bag ID	Comment		
		Lab Destination:	Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046											
Lab Contact Name/ph #		Rhoeda Ridentbauer (314)298-8566												
Matrix	# of Containers	Preservatives (water)												
		Preservatives (soil)												
		Container Type												
		16 oz. plastic jar		X						5			GJ46599774	
		16 oz. plastic jar		X						5			GJ46599774	



## All Transfers for COC 501197RSY-023

Page 4 of 4

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		10/29/2020 15:55	Locked Storage (RKillpack)		10/29/2020 15:55
Locked Storage (RKillpack)		10/30/2020 15:39	Devin Lewis		10/30/2020 15:39
Devin Lewis		10/30/2020 15:42	SHIPPEDTOLAB	FED EX	

FED EX

Michael Koenings  
MICHA KORRINH

NOV 02 2020  
08:50



## Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-40217-1  
SDG Number: GJ46599774**Login Number: 40217****List Source: Eurofins TestAmerica, St. Louis****List Number: 1****Creator: Hoerchler, Elizabeth M**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Definitions/Glossary

Page 49 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

## Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

## Method Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Page 50 of 88

Job ID: 160-40217-1  
SDG: GJ46599774

Method	Method Description	Protocol	Laboratory
905.0	Total Beta Strontium (GFPC)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-0	Preparation, Digestion/ Precipitate	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

### Protocol References:

DOE = U.S. Department of Energy

None = None

### Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# Sample Summary

Page 51 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
160-40217-1	HPPG-F-025	Solid	10/29/20 14:29	11/02/20 08:50	
160-40217-2	HPPG-F-026	Solid	10/29/20 14:57	11/02/20 08:50	
160-40217-3	HPPG-SFU-TU098B-001	Solid	10/29/20 13:52	11/02/20 08:50	
160-40217-4	HPPG-SFU-TU098B-002	Solid	10/29/20 13:56	11/02/20 08:50	
160-40217-5	HPPG-SFU-TU098B-003	Solid	10/29/20 14:01	11/02/20 08:50	
160-40217-6	HPPG-SFU-TU098B-004	Solid	10/29/20 14:05	11/02/20 08:50	
160-40217-7	HPPG-SFU-TU098B-005	Solid	10/29/20 14:08	11/02/20 08:50	
160-40217-8	HPPG-SFU-TU098B-006	Solid	10/29/20 14:11	11/02/20 08:50	
160-40217-9	HPPG-SFU-TU098B-007	Solid	10/29/20 14:14	11/02/20 08:50	
160-40217-10	HPPG-SFU-TU098B-008	Solid	10/29/20 14:18	11/02/20 08:50	
160-40217-11	HPPG-SFU-TU098B-009	Solid	10/29/20 14:22	11/02/20 08:50	
160-40217-12	HPPG-SFU-TU098B-010	Solid	10/29/20 14:26	11/02/20 08:50	
160-40217-13	HPPG-SFU-TU098B-011	Solid	10/29/20 14:29	11/02/20 08:50	
160-40217-14	HPPG-SFU-TU098B-012	Solid	10/29/20 14:32	11/02/20 08:50	
160-40217-15	HPPG-SFU-TU098B-013	Solid	10/29/20 14:34	11/02/20 08:50	
160-40217-16	HPPG-SFU-TU098B-014	Solid	10/29/20 14:36	11/02/20 08:50	
160-40217-17	HPPG-SFU-TU098B-015	Solid	10/29/20 14:38	11/02/20 08:50	
160-40217-18	HPPG-SFU-TU098B-016	Solid	10/29/20 14:41	11/02/20 08:50	
160-40217-19	HPPG-SFU-TU098B-017	Solid	10/29/20 14:42	11/02/20 08:50	
160-40217-20	HPPG-SFU-TU098B-018	Solid	10/29/20 14:44	11/02/20 08:50	
160-40217-21	HPPG-SFU-TU098B-019	Solid	10/29/20 14:46	11/02/20 08:50	
160-40217-22	HPPG-SFU-TU098B-020	Solid	10/29/20 14:46	11/02/20 08:50	
160-40217-23	HPPG-SFU-TU098B-021	Solid	10/29/20 14:48	11/02/20 08:50	
160-40217-24	HPPG-SFU-TU098B-022	Solid	10/29/20 14:50	11/02/20 08:50	
160-40217-25	HPPG-SFU-TU098B-023	Solid	10/29/20 14:53	11/02/20 08:50	
160-40217-26	HPPG-SFU-TU098B-024	Solid	10/29/20 14:54	11/02/20 08:50	
160-40217-27	HPPG-SFU-TU098B-025	Solid	10/29/20 14:57	11/02/20 08:50	

Eurofins TestAmerica, St. Louis

# Client Sample Results

Page 52 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-F-025**  
Date Collected: 10/29/20 14:29  
Date Received: 11/02/20 08:50

**Lab Sample ID: 160-40217-1**  
Matrix: Solid

## Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	-0.00509	U	0.0524	0.0524	0.160	0.0435	pCi/g	11/25/20 14:30	12/11/20 07:06	1
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Sr Carrier	105		40 - 110					11/25/20 14:30	12/11/20 07:06	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.411		0.185	0.190		0.127	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Actinium-227	0.113	U	0.542	0.543		0.333	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Bismuth-212	0.000	U	0.454	0.454		0.635	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Bismuth-214	0.0764	U	0.154	0.155		0.148	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Cesium-137	-0.0392	U	0.0679	0.0680	0.0700	0.0528	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Lead-210	1.05		1.50	1.51		0.947	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Lead-212	0.00942	U	0.126	0.126		0.103	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Lead-214	0.303		0.0991	0.104		0.0817	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Potassium-40	7.63		1.25	1.47		0.287	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Protactinium-231	0.216	U	2.58	2.58		2.12	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Protactinium-234	0.0386	U	0.0614	0.0615		0.184	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Radium-226	0.0764	U	0.154	0.155	0.200	0.148	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Radium-228	0.411		0.185	0.190		0.127	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Thallium-208	0.161		0.0532	0.0557		0.0213	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Thorium 228	0.00942	U	0.126	0.126		0.103	pCi/g	11/06/20 18:15	11/29/20 15:26	1
<b>Thorium-232</b>	<b>0.411</b>		0.185	0.190		0.127	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Thorium-234	-0.0504	U	0.985	0.985		0.812	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Uranium-235	-0.00941	U	0.227	0.227		0.187	pCi/g	11/06/20 18:15	11/29/20 15:26	1
Uranium-238	-0.0504	U	0.985	0.985		0.812	pCi/g	11/06/20 18:15	11/29/20 15:26	1

**Client Sample ID: HPPG-F-026**

**Lab Sample ID: 160-40217-2**

Date Collected: 10/29/20 14:57

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.569		0.306	0.312		0.129	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Actinium-227	0.000	U	0.387	0.387		0.393	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Bismuth-212	0.277	U	0.740	0.740		0.574	pCi/g	11/06/20 18:15	11/29/20 15:24	1
<b>Bismuth-214</b>	<b>0.434</b>		0.156	0.163		0.0633	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Cesium-137	0.00867	U	0.0642	0.0642	0.0700	0.0515	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Lead-210	0.647	U	1.25	1.26		0.854	pCi/g	11/06/20 18:15	11/29/20 15:24	1
<b>Lead-212</b>	<b>0.479</b>		0.104	0.121		0.0472	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Lead-214	0.425		0.129	0.136		0.0535	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Potassium-40	6.58		1.41	1.57		0.278	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Protactinium-231	0.000	U	0.634	0.634		2.02	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Protactinium-234	0.105	U	0.236	0.237		0.176	pCi/g	11/06/20 18:15	11/29/20 15:24	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Page 53 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-F-026**

**Lab Sample ID: 160-40217-2**

Date Collected: 10/29/20 14:57

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Radium-226	0.434		0.156	0.163	0.200	0.0633	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Radium-228	0.569		0.306	0.312		0.129	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Thallium-208	0.225		0.0722	0.0758		0.0203	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Thorium 228	0.479		0.104	0.121		0.0472	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Thorium-232	0.569		0.306	0.312		0.129	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Thorium-234	-0.711	U	0.717	0.721		0.824	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Uranium-235	0.0148	U	0.353	0.353		0.290	pCi/g	11/06/20 18:15	11/29/20 15:24	1
Uranium-238	-0.711	U	0.717	0.721		0.824	pCi/g	11/06/20 18:15	11/29/20 15:24	1

**Client Sample ID: HPPG-SFU-TU098B-001**

**Lab Sample ID: 160-40217-3**

Date Collected: 10/29/20 13:52

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Total Beta Strontium	-0.0367	U	0.0488	0.0489	0.160	0.0435	pCi/g	11/25/20 14:30	12/11/20 07:07	1
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Sr Carrier	96.8		40 - 110					11/25/20 14:30	12/11/20 07:07	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.304		0.210	0.213		0.0868	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Actinium-227	0.203	U	0.416	0.416		0.288	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Bismuth-212	0.307	U	0.908	0.908		0.720	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Bismuth-214	0.346		0.112	0.118		0.0427	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Cesium-137	-0.0671	U	0.103	0.103	0.0700	0.0805	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Lead-210	0.838	U	1.39	1.39		1.08	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Lead-212	0.375		0.103	0.114		0.0594	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Lead-214	0.499		0.152	0.161		0.0548	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Potassium-40	7.22		1.36	1.55		0.150	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Protactinium-231	-0.930	U	2.41	2.41		1.94	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Protactinium-234	0.0815	U	0.176	0.176		0.245	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Radium-226	0.346		0.112	0.118	0.200	0.0427	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Radium-228	0.304		0.210	0.213		0.0868	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Thallium-208	0.0795		0.104	0.105		0.0556	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Thorium 228	0.375		0.103	0.114		0.0594	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Thorium-232	0.304		0.210	0.213		0.0868	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Thorium-234	-0.582	U	0.813	0.816		0.807	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Uranium-235	0.0360	U	0.465	0.465		0.463	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Uranium-238	-0.582	U	0.813	0.816		0.807	pCi/g	11/06/20 18:15	11/29/20 15:21	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Page 54 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-SFU-TU098B-002**

**Lab Sample ID: 160-40217-4**

Date Collected: 10/29/20 13:56  
Date Received: 11/02/20 08:50

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.328		0.198	0.201		0.0952	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Actinium-227	-0.154	U	0.535	0.536		0.353	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Bismuth-212	-0.400	U	0.776	0.777		0.608	pCi/g	11/06/20 18:15	11/29/20 15:21	1
<b>Bismuth-214</b>	<b>0.321</b>		0.0993	0.105		0.0408	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Cesium-137	-0.0356	U	0.0622	0.0623	0.0700	0.0484	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Lead-210	0.504	U	1.15	1.15		0.771	pCi/g	11/06/20 18:15	11/29/20 15:21	1
<b>Lead-212</b>	<b>0.299</b>		0.0820	0.0907		0.0477	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Lead-214	0.295		0.111	0.115		0.0638	pCi/g	11/06/20 18:15	11/29/20 15:21	1
<b>Potassium-40</b>	<b>6.14</b>		1.15	1.31		0.332	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Protactinium-231	-0.732	U	2.52	2.52		2.05	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Protactinium-234	0.177	U	0.102	0.104		0.207	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Radium-226	0.321		0.0993	0.105	0.200	0.0408	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Radium-228	0.328		0.198	0.201		0.0952	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Thallium-208	0.125		0.0489	0.0506		0.0214	pCi/g	11/06/20 18:15	11/29/20 15:21	1
<b>Thorium 228</b>	<b>0.299</b>		0.0820	0.0907		0.0477	pCi/g	11/06/20 18:15	11/29/20 15:21	1
<b>Thorium-232</b>	<b>0.328</b>		0.198	0.201		0.0952	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Thorium-234	-0.326	U	0.823	0.824		0.687	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Uranium-235	0.00536	U	0.333	0.333		0.274	pCi/g	11/06/20 18:15	11/29/20 15:21	1
Uranium-238	-0.326	U	0.823	0.824		0.687	pCi/g	11/06/20 18:15	11/29/20 15:21	1

**Client Sample ID: HPPG-SFU-TU098B-003**

**Lab Sample ID: 160-40217-5**

Date Collected: 10/29/20 14:01  
Date Received: 11/02/20 08:50

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.371		0.224	0.228		0.0997	pCi/g	11/06/20 18:15	11/29/20 15:23	1
Actinium-227	0.113	U	0.386	0.386		0.376	pCi/g	11/06/20 18:15	11/29/20 15:23	1
Bismuth-212	0.413	U	0.950	0.951		0.747	pCi/g	11/06/20 18:15	11/29/20 15:23	1
Bismuth-214	0.108	U	0.200	0.201		0.198	pCi/g	11/06/20 18:15	11/29/20 15:23	1
Cesium-137	0.0262	U	0.0565	0.0566	0.0700	0.0433	pCi/g	11/06/20 18:15	11/29/20 15:23	1
Lead-210	0.778	U	1.56	1.56		1.02	pCi/g	11/06/20 18:15	11/29/20 15:23	1
<b>Lead-212</b>	<b>0.379</b>		0.101	0.111		0.0566	pCi/g	11/06/20 18:15	11/29/20 15:23	1
Lead-214	0.373		0.129	0.136		0.0580	pCi/g	11/06/20 18:15	11/29/20 15:23	1
<b>Potassium-40</b>	<b>7.10</b>		1.34	1.56		0.285	pCi/g	11/06/20 18:15	11/29/20 15:23	1
Protactinium-231	-1.01	U	3.40	3.40		2.77	pCi/g	11/06/20 18:15	11/29/20 15:23	1
Protactinium-234	0.115	U	0.250	0.251		0.239	pCi/g	11/06/20 18:15	11/29/20 15:23	1
Radium-226	0.108	U	0.200	0.201	0.200	0.198	pCi/g	11/06/20 18:15	11/29/20 15:23	1
Radium-228	0.371		0.224	0.228		0.0997	pCi/g	11/06/20 18:15	11/29/20 15:23	1
Thallium-208	0.201		0.0666	0.0705		0.0235	pCi/g	11/06/20 18:15	11/29/20 15:23	1
<b>Thorium 228</b>	<b>0.379</b>		0.101	0.111		0.0566	pCi/g	11/06/20 18:15	11/29/20 15:23	1
<b>Thorium-232</b>	<b>0.371</b>		0.224	0.228		0.0997	pCi/g	11/06/20 18:15	11/29/20 15:23	1
Thorium-234	-0.336	U	0.959	0.959		0.799	pCi/g	11/06/20 18:15	11/29/20 15:23	1
Uranium-235	-0.211	U	0.508	0.508		0.495	pCi/g	11/06/20 18:15	11/29/20 15:23	1
Uranium-238	-0.336	U	0.959	0.959		0.799	pCi/g	11/06/20 18:15	11/29/20 15:23	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Page 55 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-SFU-TU098B-004**

**Lab Sample ID: 160-40217-6**

Matrix: Solid

Date Collected: 10/29/20 14:05  
Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.229		0.124	0.126		0.145	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Actinium-227	0.652		0.263	0.272		0.0868	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Bismuth-212	-0.639	U	1.04	1.04		0.807	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Bismuth-214	0.329		0.103	0.109		0.0350	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Cesium-137	0.0154	U	0.0427	0.0427	0.0700	0.0328	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Lead-210	1.24		1.23	1.24		0.801	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Lead-212	0.0217	U	0.110	0.110		0.0893	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Lead-214	0.467		0.126	0.134		0.0517	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Potassium-40	8.44		1.44	1.67		0.208	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Protactinium-231	0.000	U	0.793	0.793		2.05	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Protactinium-234	-0.0217	U	0.0555	0.0555		0.216	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Radium-226	0.329		0.103	0.109	0.200	0.0350	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Radium-228	0.229		0.124	0.126		0.145	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Thallium-208	0.167		0.0485	0.0514		0.00823	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Thorium 228	0.0217	U	0.110	0.110		0.0893	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Thorium-232	0.229		0.124	0.126		0.145	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Thorium-234	0.322	U	0.418	0.419		0.355	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Uranium-235	-0.00518	U	0.0120	0.0120		0.381	pCi/g	11/06/20 18:15	11/29/20 16:04	1
Uranium-238	0.322	U	0.418	0.419		0.355	pCi/g	11/06/20 18:15	11/29/20 16:04	1

**Client Sample ID: HPPG-SFU-TU098B-005**

**Lab Sample ID: 160-40217-7**

Matrix: Solid

Date Collected: 10/29/20 14:08  
Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.311		0.226	0.228		0.115	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Actinium-227	0.0720	U	0.453	0.453		0.278	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Bismuth-212	0.00587	U	0.621	0.621		0.511	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Bismuth-214	0.0968	U	0.166	0.166		0.106	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Cesium-137	0.0250	U	0.0423	0.0424	0.0700	0.0319	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Lead-210	-0.592	U	1.44	1.44		1.20	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Lead-212	0.358		0.0814	0.0937		0.0420	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Lead-214	0.426		0.0826	0.0938		0.0354	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Potassium-40	6.04		1.06	1.23		0.259	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Protactinium-231	0.295	U	1.23	1.23		1.85	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Protactinium-234	-0.0194	U	0.0343	0.0343		0.176	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Radium-226	0.0968	U	0.166	0.166	0.200	0.106	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Radium-228	0.311		0.226	0.228		0.115	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Thallium-208	0.141		0.0471	0.0493		0.0194	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Thorium 228	0.358		0.0814	0.0937		0.0420	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Thorium-232	0.311		0.226	0.228		0.115	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Thorium-234	-0.643	U	0.846	0.849		0.710	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Uranium-235	0.0768	U	0.169	0.169		0.246	pCi/g	11/06/20 18:15	11/29/20 16:07	1
Uranium-238	-0.643	U	0.846	0.849		0.710	pCi/g	11/06/20 18:15	11/29/20 16:07	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Page 56 of 88

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-SFU-TU098B-006**

**Lab Sample ID: 160-40217-8**

Date Collected: 10/29/20 14:11

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.545		0.197	0.205		0.0402	pCi/g	11/06/20 18:15	11/29/20 15:57	1
Actinium-227	0.116	U	0.369	0.369		0.293	pCi/g	11/06/20 18:15	11/29/20 15:57	1
Bismuth-212	0.000	U	0.380	0.380		0.677	pCi/g	11/06/20 18:15	11/29/20 15:57	1
<b>Bismuth-214</b>	<b>0.253</b>		0.121	0.124		0.0610	pCi/g	11/06/20 18:15	11/29/20 15:57	1
Cesium-137	0.00474	U	0.0635	0.0635	0.0700	0.0391	pCi/g	11/06/20 18:15	11/29/20 15:57	1
<b>Lead-210</b>	<b>0.733</b>		1.09	1.10		0.722	pCi/g	11/06/20 18:15	11/29/20 15:57	1
<b>Lead-212</b>	<b>0.426</b>		0.0927	0.108		0.0379	pCi/g	11/06/20 18:15	11/29/20 15:57	1
<b>Lead-214</b>	<b>0.167</b>		0.0730	0.0750		0.118	pCi/g	11/06/20 18:15	11/29/20 15:57	1
<b>Potassium-40</b>	<b>7.34</b>		1.47	1.65		0.272	pCi/g	11/06/20 18:15	11/29/20 15:57	1
Protactinium-231	0.328	U	1.34	1.34		2.13	pCi/g	11/06/20 18:15	11/29/20 15:57	1
Protactinium-234	0.103	U	0.202	0.202		0.161	pCi/g	11/06/20 18:15	11/29/20 15:57	1
Radium-226	0.253		0.121	0.124	0.200	0.0610	pCi/g	11/06/20 18:15	11/29/20 15:57	1
Radium-228	0.545		0.197	0.205		0.0402	pCi/g	11/06/20 18:15	11/29/20 15:57	1
Thallium-208	0.184		0.0631	0.0659		0.0187	pCi/g	11/06/20 18:15	11/29/20 15:57	1
<b>Thorium 228</b>	<b>0.426</b>		0.0927	0.108		0.0379	pCi/g	11/06/20 18:15	11/29/20 15:57	1
<b>Thorium-232</b>	<b>0.545</b>		0.197	0.205		0.0402	pCi/g	11/06/20 18:15	11/29/20 15:57	1
Thorium-234	-0.493	U	0.495	0.498		0.753	pCi/g	11/06/20 18:15	11/29/20 15:57	1
Uranium-235	0.00901	U	0.0373	0.0373		0.294	pCi/g	11/06/20 18:15	11/29/20 15:57	1
Uranium-238	-0.493	U	0.495	0.498		0.753	pCi/g	11/06/20 18:15	11/29/20 15:57	1

**Client Sample ID: HPPG-SFU-TU098B-007**

**Lab Sample ID: 160-40217-9**

Date Collected: 10/29/20 14:14

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.429		0.146	0.153		0.0945	pCi/g	11/06/20 18:15	11/29/20 15:53	1
Actinium-227	0.0993	U	0.326	0.327		0.268	pCi/g	11/06/20 18:15	11/29/20 15:53	1
Bismuth-212	0.234	U	0.388	0.389		0.289	pCi/g	11/06/20 18:15	11/29/20 15:53	1
<b>Bismuth-214</b>	<b>0.406</b>		0.0973	0.106		0.0373	pCi/g	11/06/20 18:15	11/29/20 15:53	1
Cesium-137	0.0229	U	0.0391	0.0392	0.0700	0.0298	pCi/g	11/06/20 18:15	11/29/20 15:53	1
Lead-210	-0.658	U	1.42	1.42		1.15	pCi/g	11/06/20 18:15	11/29/20 15:53	1
<b>Lead-212</b>	<b>0.455</b>		0.0742	0.0947		0.0301	pCi/g	11/06/20 18:15	11/29/20 15:53	1
<b>Lead-214</b>	<b>0.417</b>		0.0827	0.0933		0.0373	pCi/g	11/06/20 18:15	11/29/20 15:53	1
<b>Potassium-40</b>	<b>7.81</b>		1.06	1.33		0.0834	pCi/g	11/06/20 18:15	11/29/20 15:53	1
Protactinium-231	0.000	U	0.281	0.281		1.65	pCi/g	11/06/20 18:15	11/29/20 15:53	1
Protactinium-234	0.0642	U	0.187	0.187		0.190	pCi/g	11/06/20 18:15	11/29/20 15:53	1
Radium-226	0.406		0.0973	0.106	0.200	0.0373	pCi/g	11/06/20 18:15	11/29/20 15:53	1
Radium-228	0.429		0.146	0.153		0.0945	pCi/g	11/06/20 18:15	11/29/20 15:53	1
Thallium-208	0.175		0.0466	0.0500		0.0137	pCi/g	11/06/20 18:15	11/29/20 15:53	1
<b>Thorium 228</b>	<b>0.455</b>		0.0742	0.0947		0.0301	pCi/g	11/06/20 18:15	11/29/20 15:53	1
<b>Thorium-232</b>	<b>0.429</b>		0.146	0.153		0.0945	pCi/g	11/06/20 18:15	11/29/20 15:53	1
Thorium-234	-0.0629	U	0.128	0.129		0.845	pCi/g	11/06/20 18:15	11/29/20 15:53	1
Uranium-235	-0.0254	U	0.0396	0.0397		0.324	pCi/g	11/06/20 18:15	11/29/20 15:53	1
Uranium-238	-0.0629	U	0.128	0.129		0.845	pCi/g	11/06/20 18:15	11/29/20 15:53	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Page 57 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-SFU-TU098B-008**

**Lab Sample ID: 160-40217-10**

Date Collected: 10/29/20 14:18

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.220		0.279	0.280		0.176	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Actinium-227	0.102	U	0.368	0.369		0.344	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Bismuth-212	0.000	U	0.329	0.329		0.563	pCi/g	11/06/20 18:15	11/29/20 15:54	1
<b>Bismuth-214</b>	<b>0.357</b>		0.151	0.156		0.0677	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Cesium-137	-0.0349	U	0.0616	0.0617	0.0700	0.0470	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Lead-210	-1.25	U	1.76	1.77		1.42	pCi/g	11/06/20 18:15	11/29/20 15:54	1
<b>Lead-212</b>	<b>0.483</b>		0.103	0.121		0.0521	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Lead-214	0.423		0.129	0.136		0.0590	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Potassium-40	8.85		1.47	1.73		0.143	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Protactinium-231	0.000	U	0.388	0.388		2.31	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Protactinium-234	-0.130	U	0.345	0.345		0.280	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Radium-226	0.357		0.151	0.156	0.200	0.0677	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Radium-228	0.220		0.279	0.280		0.176	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Thallium-208	0.160		0.0586	0.0609		0.0225	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Thorium 228	0.483		0.103	0.121		0.0521	pCi/g	11/06/20 18:15	11/29/20 15:54	1
<b>Thorium-232</b>	<b>0.220</b>		0.279	0.280		0.176	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Thorium-234	-0.0734	U	0.887	0.887		0.729	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Uranium-235	0.211	U	0.416	0.416		0.427	pCi/g	11/06/20 18:15	11/29/20 15:54	1
Uranium-238	-0.0734	U	0.887	0.887		0.729	pCi/g	11/06/20 18:15	11/29/20 15:54	1

**Client Sample ID: HPPG-SFU-TU098B-009**

**Lab Sample ID: 160-40217-11**

Date Collected: 10/29/20 14:22

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.354		0.158	0.162		0.0778	pCi/g	11/06/20 18:15	11/29/20 15:55	1
Actinium-227	-0.290	U	0.520	0.521		0.334	pCi/g	11/06/20 18:15	11/29/20 15:55	1
<b>Bismuth-212</b>	<b>0.962</b>		0.437	0.448		0.139	pCi/g	11/06/20 18:15	11/29/20 15:55	1
<b>Bismuth-214</b>	<b>0.307</b>		0.101	0.106		0.0422	pCi/g	11/06/20 18:15	11/29/20 15:55	1
Cesium-137	0.00195	U	0.0538	0.0538	0.0700	0.0442	pCi/g	11/06/20 18:15	11/29/20 15:55	1
Lead-210	-0.0954	U	1.35	1.35		1.11	pCi/g	11/06/20 18:15	11/29/20 15:55	1
<b>Lead-212</b>	<b>0.262</b>		0.0796	0.0865		0.0478	pCi/g	11/06/20 18:15	11/29/20 15:55	1
Lead-214	0.351		0.105	0.111		0.0473	pCi/g	11/06/20 18:15	11/29/20 15:55	1
Potassium-40	5.09		0.986	1.12		0.257	pCi/g	11/06/20 18:15	11/29/20 15:55	1
Protactinium-231	0.0863	U	0.317	0.317		1.87	pCi/g	11/06/20 18:15	11/29/20 15:55	1
Protactinium-234	0.0767	U	0.244	0.245		0.199	pCi/g	11/06/20 18:15	11/29/20 15:55	1
Radium-226	0.307		0.101	0.106	0.200	0.0422	pCi/g	11/06/20 18:15	11/29/20 15:55	1
Radium-228	0.354		0.158	0.162		0.0778	pCi/g	11/06/20 18:15	11/29/20 15:55	1
Thallium-208	0.149		0.0555	0.0577		0.0224	pCi/g	11/06/20 18:15	11/29/20 15:55	1
Thorium 228	0.262		0.0796	0.0865		0.0478	pCi/g	11/06/20 18:15	11/29/20 15:55	1
<b>Thorium-232</b>	<b>0.354</b>		0.158	0.162		0.0778	pCi/g	11/06/20 18:15	11/29/20 15:55	1
Thorium-234	-0.706	U	0.741	0.745		0.571	pCi/g	11/06/20 18:15	11/29/20 15:55	1
Uranium-235	0.0881	U	0.202	0.202		0.346	pCi/g	11/06/20 18:15	11/29/20 15:55	1
Uranium-238	-0.706	U	0.741	0.745		0.571	pCi/g	11/06/20 18:15	11/29/20 15:55	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Page 58 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-SFU-TU098B-010**

**Lab Sample ID: 160-40217-12**

Date Collected: 10/29/20 14:26  
Date Received: 11/02/20 08:50

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.351		0.300	0.302		0.174	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Actinium-227	0.0472	U	0.129	0.129		0.531	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Bismuth-212	0.146	U	0.961	0.961		0.777	pCi/g	11/06/20 18:15	11/29/20 16:27	1
<b>Bismuth-214</b>	<b>0.680</b>		0.160	0.178		0.0451	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Cesium-137	0.109		0.0586	0.0599	0.0700	0.0304	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Lead-210	1.24		1.56	1.57		1.07	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Lead-212	0.510		0.118	0.133		0.0602	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Lead-214	0.391		0.148	0.155		0.0681	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Potassium-40	7.76		1.51	1.76		0.334	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Protactinium-231	0.912	U	2.78	2.78		2.25	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Protactinium-234	0.204	U	0.0989	0.102		0.337	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Radium-226	0.680		0.160	0.178	0.200	0.0451	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Radium-228	0.351		0.300	0.302		0.174	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Thallium-208	0.208		0.0680	0.0721		0.0239	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Thorium 228	0.510		0.118	0.133		0.0602	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Thorium-232	0.351		0.300	0.302		0.174	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Thorium-234	0.860		0.714	0.722		0.540	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Uranium-235	-0.0136	U	0.798	0.798		0.593	pCi/g	11/06/20 18:15	11/29/20 16:27	1
Uranium-238	0.860		0.714	0.722		0.540	pCi/g	11/06/20 18:15	11/29/20 16:27	1

**Client Sample ID: HPPG-SFU-TU098B-011**

**Lab Sample ID: 160-40217-13**

Date Collected: 10/29/20 14:29  
Date Received: 11/02/20 08:50

Matrix: Solid

## Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Total Beta Strontium	0.0517		0.0519	0.0520	0.160	0.0382	pCi/g	11/25/20 15:25	12/11/20 07:10	1
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Sr Carrier	107		40 - 110					11/25/20 15:25	12/11/20 07:10	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.519		0.183	0.191		0.0659	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Actinium-227	0.100	U	0.392	0.392		0.351	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Bismuth-212	0.304	U	0.835	0.836		0.662	pCi/g	11/06/20 18:15	11/29/20 16:35	1
<b>Bismuth-214</b>	<b>0.370</b>		0.151	0.156		0.0646	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Cesium-137	0.0226	U	0.0483	0.0484	0.0700	0.0370	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Lead-210	0.428	U	1.32	1.33		0.928	pCi/g	11/06/20 18:15	11/29/20 16:35	1
<b>Lead-212</b>	<b>0.351</b>		0.0951	0.105		0.0541	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Lead-214	0.464		0.138	0.146		0.0634	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Potassium-40	6.36		1.20	1.37		0.308	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Protactinium-231	-0.838	U	3.00	3.00		2.44	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Protactinium-234	-0.108	U	0.330	0.330		0.269	pCi/g	11/06/20 18:15	11/29/20 16:35	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Page 59 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-SFU-TU098B-011**

**Lab Sample ID: 160-40217-13**

Date Collected: 10/29/20 14:29

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Radium-226	0.370		0.151	0.156	0.200	0.0646	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Radium-228	0.519		0.183	0.191		0.0659	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Thallium-208	0.179		0.0694	0.0719		0.0269	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Thorium 228	0.351		0.0951	0.105		0.0541	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Thorium-232	0.519		0.183	0.191		0.0659	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Thorium-234	-1.13 U		0.856	0.865		0.974	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Uranium-235	-0.204 U		0.658	0.659		0.538	pCi/g	11/06/20 18:15	11/29/20 16:35	1
Uranium-238	-1.13 U		0.856	0.865		0.974	pCi/g	11/06/20 18:15	11/29/20 16:35	1

**Client Sample ID: HPPG-SFU-TU098B-012**

**Lab Sample ID: 160-40217-14**

Date Collected: 10/29/20 14:32

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Actinium 228	0.647		0.210	0.220		0.0379	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Actinium-227	0.197 U		0.448	0.448		0.374	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Bismuth-212	0.291 U		0.602	0.602		0.453	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Bismuth-214	0.490		0.191	0.198		0.0793	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Cesium-137	0.000 U		0.0120	0.0120	0.0700	0.0530	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Lead-210	-0.234 U		1.66	1.66		1.37	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Lead-212	0.419		0.110	0.122		0.0621	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Lead-214	0.475		0.119	0.129		0.0319	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Potassium-40	7.49		1.41	1.61		0.156	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Protactinium-231	0.915 U		2.67	2.67		2.16	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Protactinium-234	0.192 U		0.135	0.137		0.253	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Radium-226	0.490		0.191	0.198	0.200	0.0793	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Radium-228	0.647		0.210	0.220		0.0379	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Thallium-208	0.265		0.0799	0.0845		0.0268	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Thorium 228	0.419		0.110	0.122		0.0621	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Thorium-232	0.647		0.210	0.220		0.0379	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Thorium-234	0.320 U		0.529	0.530		0.463	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Uranium-235	-0.266 U		0.319	0.320		0.527	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Uranium-238	0.320 U		0.529	0.530		0.463	pCi/g	11/06/20 18:15	11/29/20 16:36	1

**Client Sample ID: HPPG-SFU-TU098B-013**

**Lab Sample ID: 160-40217-15**

Date Collected: 10/29/20 14:34

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Actinium 228	0.312		0.199	0.202		0.0879	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Actinium-227	-0.208 U		0.513	0.514		0.298	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Bismuth-212	0.251 U		0.447	0.448		0.338	pCi/g	11/06/20 18:15	11/29/20 16:36	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Page 60 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-SFU-TU098B-013**

**Lab Sample ID: 160-40217-15**

Date Collected: 10/29/20 14:34  
Date Received: 11/02/20 08:50

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Bismuth-214	0.310		0.0847	0.0906		0.0356	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Cesium-137	-0.0346	U	0.0651	0.0652	0.0700	0.0513	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Lead-210	0.546	U	1.00	1.00		0.792	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Lead-212	0.451		0.0790	0.0983		0.0350	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Lead-214	0.428		0.0909	0.101		0.0387	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Potassium-40	7.96		1.11	1.37		0.0896	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Protactinium-231	0.000	U	0.578	0.578		1.88	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Protactinium-234	-0.00953	U	0.0202	0.0203		0.210	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Radium-226	0.310		0.0847	0.0906	0.200	0.0356	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Radium-228	0.312		0.199	0.202		0.0879	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Thallium-208	0.166		0.0530	0.0558		0.0175	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Thorium 228	0.451		0.0790	0.0983		0.0350	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Thorium-232	0.312		0.199	0.202		0.0879	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Thorium-234	0.269	U	0.766	0.767		0.623	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Uranium-235	0.0852	U	0.157	0.158		0.367	pCi/g	11/06/20 18:15	11/29/20 16:36	1
Uranium-238	0.269	U	0.766	0.767		0.623	pCi/g	11/06/20 18:15	11/29/20 16:36	1

**Client Sample ID: HPPG-SFU-TU098B-014**

**Lab Sample ID: 160-40217-16**

Date Collected: 10/29/20 14:36  
Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium 228	0.437		0.211	0.215		0.128	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Actinium-227	0.298	U	0.593	0.594		0.354	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Bismuth-212	0.294	U	0.797	0.798		0.628	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Bismuth-214	0.453		0.143	0.151		0.0629	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Cesium-137	0.00265	U	0.0592	0.0592	0.0700	0.0485	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Lead-210	0.721	U	1.70	1.70		1.16	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Lead-212	0.0506	U	0.138	0.138		0.112	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Lead-214	0.537		0.129	0.140		0.0690	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Potassium-40	7.56		1.29	1.50		0.129	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Protactinium-231	0.000	U	0.399	0.399		2.47	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Protactinium-234	-0.0419	U	0.134	0.134		0.314	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Radium-226	0.453		0.143	0.151	0.200	0.0629	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Radium-228	0.437		0.211	0.215		0.128	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Thallium-208	0.233		0.0574	0.0621		0.00823	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Thorium 228	0.0506	U	0.138	0.138		0.112	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Thorium-232	0.437		0.211	0.215		0.128	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Thorium-234	-0.614	U	0.723	0.726		1.43	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Uranium-235	0.422	U	0.304	0.307		0.456	pCi/g	11/06/20 18:15	11/29/20 16:37	1
Uranium-238	-0.614	U	0.723	0.726		1.43	pCi/g	11/06/20 18:15	11/29/20 16:37	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Page 61 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-SFU-TU098B-015**

**Lab Sample ID: 160-40217-17**

Matrix: Solid

Date Collected: 10/29/20 14:38  
Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.504		0.135	0.144		0.0854	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Actinium-227	0.145	U	0.312	0.312		0.247	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Bismuth-212	0.000	U	0.525	0.525		0.541	pCi/g	11/06/20 18:15	11/29/20 16:39	1
<b>Bismuth-214</b>	<b>0.352</b>		0.110	0.116		0.0436	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Cesium-137	-0.00846	U	0.0627	0.0628	0.0700	0.0511	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Lead-210	0.634	U	1.30	1.31		1.04	pCi/g	11/06/20 18:15	11/29/20 16:39	1
<b>Lead-212</b>	<b>0.505</b>		0.0837	0.106		0.0344	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Lead-214	0.431		0.0860	0.0970		0.0465	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Potassium-40	6.75		1.09	1.29		0.263	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Protactinium-231	-0.833	U	2.68	2.68		2.18	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Protactinium-234	0.0790	U	0.165	0.165		0.197	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Radium-226	0.352		0.110	0.116	0.200	0.0436	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Radium-228	0.504		0.135	0.144		0.0854	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Thallium-208	0.164		0.0527	0.0554		0.0183	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Thorium 228	0.505		0.0837	0.106		0.0344	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Thorium-232	0.504		0.135	0.144		0.0854	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Thorium-234	-0.331	U	0.376	0.378		0.850	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Uranium-235	-0.154	U	0.410	0.411		0.333	pCi/g	11/06/20 18:15	11/29/20 16:39	1
Uranium-238	-0.331	U	0.376	0.378		0.850	pCi/g	11/06/20 18:15	11/29/20 16:39	1

**Client Sample ID: HPPG-SFU-TU098B-016**

**Lab Sample ID: 160-40217-18**

Date Collected: 10/29/20 14:41  
Date Received: 11/02/20 08:50

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.492		0.176	0.184		0.0962	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Actinium-227	0.0885	U	0.379	0.379		0.370	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Bismuth-212	-0.123	U	0.917	0.917		0.742	pCi/g	11/06/20 18:15	11/29/20 16:40	1
<b>Bismuth-214</b>	<b>0.284</b>		0.136	0.139		0.0691	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Cesium-137	0.0134	U	0.0961	0.0961	0.0700	0.0778	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Lead-210	1.54		1.40	1.41		0.788	pCi/g	11/06/20 18:15	11/29/20 16:40	1
<b>Lead-212</b>	<b>0.422</b>		0.102	0.115		0.0489	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Lead-214	0.445		0.112	0.121		0.0628	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Potassium-40	8.36		1.61	1.82		0.288	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Protactinium-231	0.636	U	2.02	2.02		2.22	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Protactinium-234	0.0677	U	0.109	0.109		0.188	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Radium-226	0.284		0.136	0.139	0.200	0.0691	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Radium-228	0.492		0.176	0.184		0.0962	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Thallium-208	0.188		0.0752	0.0777		0.0285	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Thorium 228	0.422		0.102	0.115		0.0489	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Thorium-232	0.492		0.176	0.184		0.0962	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Thorium-234	0.436		0.440	0.443		0.372	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Uranium-235	-0.0400	U	0.0788	0.0789		0.304	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Uranium-238	0.436		0.440	0.443		0.372	pCi/g	11/06/20 18:15	11/29/20 16:40	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Page 62 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-SFU-TU098B-017**

**Lab Sample ID: 160-40217-19**

Date Collected: 10/29/20 14:42  
Date Received: 11/02/20 08:50

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.456		0.180	0.186		0.0608	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Actinium-227	0.124	U	0.352	0.352		0.336	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Bismuth-212	-0.0417	U	0.726	0.726		0.595	pCi/g	11/06/20 18:15	11/29/20 16:40	1
<b>Bismuth-214</b>	<b>0.366</b>		0.107	0.113		0.0398	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Cesium-137	0.0169	U	0.0528	0.0529	0.0700	0.0419	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Lead-210	0.642	U		1.12		0.772	pCi/g	11/06/20 18:15	11/29/20 16:40	1
<b>Lead-212</b>	<b>0.295</b>		0.0768	0.0857		0.0412	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Lead-214	0.323		0.0975	0.103		0.0764	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Potassium-40	7.64		1.19	1.43		0.263	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Protactinium-231	0.000	U	0.890	0.890		1.96	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Protactinium-234	0.0490	U	0.0931	0.0932		0.149	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Radium-226	0.366		0.107	0.113	0.200	0.0398	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Radium-228	0.456		0.180	0.186		0.0608	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Thallium-208	0.0927		0.0913	0.0918		0.0405	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Thorium 228	0.295		0.0768	0.0857		0.0412	pCi/g	11/06/20 18:15	11/29/20 16:40	1
<b>Thorium-232</b>	<b>0.456</b>		0.180	0.186		0.0608	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Thorium-234	-0.258	U	0.834	0.834		0.694	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Uranium-235	0.0876	U	0.265	0.265		0.213	pCi/g	11/06/20 18:15	11/29/20 16:40	1
Uranium-238	-0.258	U	0.834	0.834		0.694	pCi/g	11/06/20 18:15	11/29/20 16:40	1

**Client Sample ID: HPPG-SFU-TU098B-018**

**Lab Sample ID: 160-40217-20**

Date Collected: 10/29/20 14:44  
Date Received: 11/02/20 08:50

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.444		0.121	0.129		0.0395	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Actinium-227	0.180	U	0.333	0.334		0.259	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Bismuth-212	0.000	U	0.154	0.154		0.421	pCi/g	11/06/20 18:15	11/29/20 15:19	1
<b>Bismuth-214</b>	<b>0.426</b>		0.121	0.129		0.0452	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Cesium-137	0.0182	U	0.0418	0.0419	0.0700	0.0326	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Lead-210	0.569	U	1.06	1.07		0.843	pCi/g	11/06/20 18:15	11/29/20 15:19	1
<b>Lead-212</b>	<b>0.389</b>		0.0799	0.0945		0.0411	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Lead-214	0.332		0.0861	0.0928		0.0433	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Potassium-40	7.58		1.37	1.58		0.456	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Protactinium-231	-0.729	U	2.23	2.23		1.81	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Protactinium-234	-0.0511	U	0.236	0.236		0.193	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Radium-226	0.426		0.121	0.129	0.200	0.0452	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Radium-228	0.444		0.121	0.129		0.0395	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Thallium-208	0.133		0.0570	0.0586		0.0250	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Thorium 228	0.389		0.0799	0.0945		0.0411	pCi/g	11/06/20 18:15	11/29/20 15:19	1
<b>Thorium-232</b>	<b>0.444</b>		0.121	0.129		0.0395	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Thorium-234	-0.349	U	0.362	0.364		0.948	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Uranium-235	0.0182	U	0.211	0.211		0.333	pCi/g	11/06/20 18:15	11/29/20 15:19	1
Uranium-238	-0.349	U	0.362	0.364		0.948	pCi/g	11/06/20 18:15	11/29/20 15:19	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Page 63 of 88

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-SFU-TU098B-019**

**Lab Sample ID: 160-40217-21**

Date Collected: 10/29/20 14:46  
Date Received: 11/02/20 08:50

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.607		0.182	0.195		0.0991	pCi/g	11/06/20 19:32	11/29/20 14:07	1
Actinium-227	0.137 U		0.519	0.519		0.434	pCi/g	11/06/20 19:32	11/29/20 14:07	1
Bismuth-212	0.400 U		0.757	0.759		0.575	pCi/g	11/06/20 19:32	11/29/20 14:07	1
<b>Bismuth-214</b>	<b>0.413</b>		0.151	0.158		0.0643	pCi/g	11/06/20 19:32	11/29/20 14:07	1
Cesium-137	-0.000545 U		0.0678	0.0678	0.0700	0.0391	pCi/g	11/06/20 19:32	11/29/20 14:07	1
Lead-210	-0.801 U		1.96	1.96		1.65	pCi/g	11/06/20 19:32	11/29/20 14:07	1
<b>Lead-212</b>	<b>0.531</b>		0.124	0.139		0.0681	pCi/g	11/06/20 19:32	11/29/20 14:07	1
Lead-214	0.467		0.123	0.135		0.0653	pCi/g	11/06/20 19:32	11/29/20 14:07	1
<b>Potassium-40</b>	<b>7.97</b>		1.49	1.75		0.318	pCi/g	11/06/20 19:32	11/29/20 14:07	1
Protactinium-231	-1.29 U		3.65	3.66		2.97	pCi/g	11/06/20 19:32	11/29/20 14:07	1
Protactinium-234	-0.134 U		0.407	0.407		0.331	pCi/g	11/06/20 19:32	11/29/20 14:07	1
Radium-226	0.413		0.151	0.158	0.200	0.0643	pCi/g	11/06/20 19:32	11/29/20 14:07	1
Radium-228	0.607		0.182	0.195		0.0991	pCi/g	11/06/20 19:32	11/29/20 14:07	1
Thallium-208	0.212		0.0631	0.0676		0.0175	pCi/g	11/06/20 19:32	11/29/20 14:07	1
<b>Thorium 228</b>	<b>0.531</b>		0.124	0.139		0.0681	pCi/g	11/06/20 19:32	11/29/20 14:07	1
<b>Thorium-232</b>	<b>0.607</b>		0.182	0.195		0.0991	pCi/g	11/06/20 19:32	11/29/20 14:07	1
Thorium-234	-0.595 U		0.833	0.836		1.08	pCi/g	11/06/20 19:32	11/29/20 14:07	1
Uranium-235	-0.0373 U		0.0771	0.0772		0.554	pCi/g	11/06/20 19:32	11/29/20 14:07	1
Uranium-238	-0.595 U		0.833	0.836		1.08	pCi/g	11/06/20 19:32	11/29/20 14:07	1

**Client Sample ID: HPPG-SFU-TU098B-020**

**Lab Sample ID: 160-40217-22**

Date Collected: 10/29/20 14:46  
Date Received: 11/02/20 08:50

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.564		0.141	0.152		0.0271	pCi/g	11/06/20 19:32	11/29/20 14:48	1
Actinium-227	0.219 U		0.456	0.456		0.272	pCi/g	11/06/20 19:32	11/29/20 14:48	1
Bismuth-212	0.0748 U		0.731	0.731		0.596	pCi/g	11/06/20 19:32	11/29/20 14:48	1
Bismuth-214	0.0411 U		0.204	0.204		0.166	pCi/g	11/06/20 19:32	11/29/20 14:48	1
Cesium-137	-0.0490 U		0.0844	0.0846	0.0700	0.0665	pCi/g	11/06/20 19:32	11/29/20 14:48	1
Lead-210	0.324 U		1.12	1.12		0.817	pCi/g	11/06/20 19:32	11/29/20 14:48	1
<b>Lead-212</b>	<b>0.438</b>		0.0881	0.105		0.0412	pCi/g	11/06/20 19:32	11/29/20 14:48	1
Lead-214	0.438		0.0994	0.109		0.0428	pCi/g	11/06/20 19:32	11/29/20 14:48	1
<b>Potassium-40</b>	<b>7.84</b>		1.24	1.48		0.278	pCi/g	11/06/20 19:32	11/29/20 14:48	1
Protactinium-231	0.317 U		1.34	1.34		2.08	pCi/g	11/06/20 19:32	11/29/20 14:48	1
Protactinium-234	0.0661 U		0.0981	0.0983		0.164	pCi/g	11/06/20 19:32	11/29/20 14:48	1
Radium-226	0.0411 U		0.204	0.204	0.200	0.166	pCi/g	11/06/20 19:32	11/29/20 14:48	1
Radium-228	0.564		0.141	0.152		0.0271	pCi/g	11/06/20 19:32	11/29/20 14:48	1
Thallium-208	0.192		0.0615	0.0647		0.0249	pCi/g	11/06/20 19:32	11/29/20 14:48	1
<b>Thorium 228</b>	<b>0.438</b>		0.0881	0.105		0.0412	pCi/g	11/06/20 19:32	11/29/20 14:48	1
<b>Thorium-232</b>	<b>0.564</b>		0.141	0.152		0.0271	pCi/g	11/06/20 19:32	11/29/20 14:48	1
Thorium-234	0.345 U		0.450	0.451		0.402	pCi/g	11/06/20 19:32	11/29/20 14:48	1
Uranium-235	0.131 U		0.325	0.325		0.259	pCi/g	11/06/20 19:32	11/29/20 14:48	1
Uranium-238	0.345 U		0.450	0.451		0.402	pCi/g	11/06/20 19:32	11/29/20 14:48	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Page 64 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-SFU-TU098B-021**

**Lab Sample ID: 160-40217-23**

Date Collected: 10/29/20 14:48

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.00492	U	0.0580	0.0580	0.160	0.0473	pCi/g	11/25/20 15:25	12/11/20 08:10	1
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Sr Carrier	99.1		40 - 110					11/25/20 15:25	12/11/20 08:10	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.467		0.201	0.206		0.0482	pCi/g	11/06/20 19:32	11/29/20 14:39	1
Actinium-227	0.0723	U	0.164	0.164		0.479	pCi/g	11/06/20 19:32	11/29/20 14:39	1
Bismuth-212	0.325	U	1.02	1.03		0.809	pCi/g	11/06/20 19:32	11/29/20 14:39	1
<b>Bismuth-214</b>	<b>0.417</b>		0.163	0.168		0.0710	pCi/g	11/06/20 19:32	11/29/20 14:39	1
Cesium-137	0.0113	U	0.0731	0.0731	0.0700	0.0584	pCi/g	11/06/20 19:32	11/29/20 14:39	1
<b>Lead-210</b>	<b>0.939</b>		1.32	1.32		0.865	pCi/g	11/06/20 19:32	11/29/20 14:39	1
<b>Lead-212</b>	<b>0.451</b>		0.107	0.122		0.0469	pCi/g	11/06/20 19:32	11/29/20 14:39	1
<b>Lead-214</b>	<b>0.450</b>		0.141	0.148		0.0596	pCi/g	11/06/20 19:32	11/29/20 14:39	1
Potassium-40	8.64		1.75	1.96		0.326	pCi/g	11/06/20 19:32	11/29/20 14:39	1
Protactinium-231	0.790	U	2.02	2.02		2.22	pCi/g	11/06/20 19:32	11/29/20 14:39	1
Protactinium-234	-0.105	U	0.117	0.117		0.218	pCi/g	11/06/20 19:32	11/29/20 14:39	1
Radium-226	0.417		0.163	0.168	0.200	0.0710	pCi/g	11/06/20 19:32	11/29/20 14:39	1
Radium-228	0.467		0.201	0.206		0.0482	pCi/g	11/06/20 19:32	11/29/20 14:39	1
Thallium-208	0.124		0.0995	0.100		0.0518	pCi/g	11/06/20 19:32	11/29/20 14:39	1
Thorium 228	0.451		0.107	0.122		0.0469	pCi/g	11/06/20 19:32	11/29/20 14:39	1
Thorium-232	0.467		0.201	0.206		0.0482	pCi/g	11/06/20 19:32	11/29/20 14:39	1
Thorium-234	0.507		0.554	0.557		0.474	pCi/g	11/06/20 19:32	11/29/20 14:39	1
Uranium-235	0.138	U	0.339	0.340		0.347	pCi/g	11/06/20 19:32	11/29/20 14:39	1
Uranium-238	0.507		0.554	0.557		0.474	pCi/g	11/06/20 19:32	11/29/20 14:39	1

**Client Sample ID: HPPG-SFU-TU098B-022**

**Lab Sample ID: 160-40217-24**

Date Collected: 10/29/20 14:50

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.642		0.192	0.203		0.0330	pCi/g	11/06/20 19:32	11/29/20 14:41	1
Actinium-227	-0.365	U	0.717	0.718		0.432	pCi/g	11/06/20 19:32	11/29/20 14:41	1
Bismuth-212	-0.323	U	0.929	0.929		0.738	pCi/g	11/06/20 19:32	11/29/20 14:41	1
<b>Bismuth-214</b>	<b>0.255</b>		0.109	0.112		0.123	pCi/g	11/06/20 19:32	11/29/20 14:41	1
Cesium-137	-0.0306	U	0.0932	0.0933	0.0700	0.0747	pCi/g	11/06/20 19:32	11/29/20 14:41	1
<b>Lead-210</b>	<b>1.27</b>		1.55	1.56		1.05	pCi/g	11/06/20 19:32	11/29/20 14:41	1
<b>Lead-212</b>	<b>0.549</b>		0.109	0.123		0.0526	pCi/g	11/06/20 19:32	11/29/20 14:41	1
<b>Lead-214</b>	<b>0.636</b>		0.159	0.171		0.0603	pCi/g	11/06/20 19:32	11/29/20 14:41	1
Potassium-40	8.51		1.37	1.61		0.128	pCi/g	11/06/20 19:32	11/29/20 14:41	1
Protactinium-231	-0.843	U	3.09	3.09		2.52	pCi/g	11/06/20 19:32	11/29/20 14:41	1
Protactinium-234	0.0659	U	0.320	0.320		0.274	pCi/g	11/06/20 19:32	11/29/20 14:41	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Page 65 of 88

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-SFU-TU098B-022**

**Lab Sample ID: 160-40217-24**

Date Collected: 10/29/20 14:50

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Radium-226	0.255		0.109	0.112	0.200	0.123	pCi/g	11/06/20 19:32	11/29/20 14:41	1
Radium-228	0.642		0.192	0.203		0.0330	pCi/g	11/06/20 19:32	11/29/20 14:41	1
Thallium-208	0.258		0.0914	0.0951		0.0322	pCi/g	11/06/20 19:32	11/29/20 14:41	1
Thorium 228	0.549		0.109	0.123		0.0526	pCi/g	11/06/20 19:32	11/29/20 14:41	1
Thorium-232	0.642		0.192	0.203		0.0330	pCi/g	11/06/20 19:32	11/29/20 14:41	1
Thorium-234	-0.734 U		0.721	0.726		0.984	pCi/g	11/06/20 19:32	11/29/20 14:41	1
Uranium-235	-0.180 U		0.561	0.561		0.456	pCi/g	11/06/20 19:32	11/29/20 14:41	1
Uranium-238	-0.734 U		0.721	0.726		0.984	pCi/g	11/06/20 19:32	11/29/20 14:41	1

**Client Sample ID: HPPG-SFU-TU098B-023**

**Lab Sample ID: 160-40217-25**

Date Collected: 10/29/20 14:53

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Actinium 228	0.343		0.138	0.143		0.0826	pCi/g	11/06/20 19:32	11/29/20 14:43	1
Actinium-227	-0.283 U		0.542	0.543		0.313	pCi/g	11/06/20 19:32	11/29/20 14:43	1
Bismuth-212	-0.409 U		0.713	0.714		0.559	pCi/g	11/06/20 19:32	11/29/20 14:43	1
<b>Bismuth-214</b>	<b>0.260</b>		0.0926	0.0964		0.0447	pCi/g	11/06/20 19:32	11/29/20 14:43	1
Cesium-137	0.00244 U		0.0462	0.0462	0.0700	0.0379	pCi/g	11/06/20 19:32	11/29/20 14:43	1
Lead-210	0.528 U		1.15	1.15		0.920	pCi/g	11/06/20 19:32	11/29/20 14:43	1
<b>Lead-212</b>	<b>0.437</b>		0.0719	0.0915		0.0277	pCi/g	11/06/20 19:32	11/29/20 14:43	1
<b>Lead-214</b>	<b>0.396</b>		0.0762	0.0866		0.0258	pCi/g	11/06/20 19:32	11/29/20 14:43	1
<b>Potassium-40</b>	<b>5.20</b>		0.867	1.02		0.0842	pCi/g	11/06/20 19:32	11/29/20 14:43	1
Protactinium-231	0.470 U		1.37	1.37		1.50	pCi/g	11/06/20 19:32	11/29/20 14:43	1
Protactinium-234	0.0534 U		0.0689	0.0691		0.198	pCi/g	11/06/20 19:32	11/29/20 14:43	1
<b>Radium-226</b>	<b>0.260</b>		0.0926	0.0964	0.200	0.0447	pCi/g	11/06/20 19:32	11/29/20 14:43	1
<b>Radium-228</b>	<b>0.343</b>		0.138	0.143		0.0826	pCi/g	11/06/20 19:32	11/29/20 14:43	1
Thallium-208	0.170		0.0465	0.0498		0.0119	pCi/g	11/06/20 19:32	11/29/20 14:43	1
Thorium 228	0.437		0.0719	0.0915		0.0277	pCi/g	11/06/20 19:32	11/29/20 14:43	1
<b>Thorium-232</b>	<b>0.343</b>		0.138	0.143		0.0826	pCi/g	11/06/20 19:32	11/29/20 14:43	1
Thorium-234	0.199 U		0.429	0.430		0.290	pCi/g	11/06/20 19:32	11/29/20 14:43	1
Uranium-235	0.130 U		0.234	0.234		0.363	pCi/g	11/06/20 19:32	11/29/20 14:43	1
Uranium-238	0.199 U		0.429	0.430		0.290	pCi/g	11/06/20 19:32	11/29/20 14:43	1

**Client Sample ID: HPPG-SFU-TU098B-024**

**Lab Sample ID: 160-40217-26**

Date Collected: 10/29/20 14:54

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Actinium 228	0.293		0.123	0.127		0.132	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Actinium-227	-0.268 U		0.759	0.760		0.462	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Bismuth-212	0.459 U		0.800	0.802		0.609	pCi/g	11/06/20 19:32	11/29/20 14:45	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Page 66 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

**Client Sample ID: HPPG-SFU-TU098B-024**

**Lab Sample ID: 160-40217-26**

Date Collected: 10/29/20 14:54

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Bismuth-214	0.376		0.159	0.165		0.0733	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Cesium-137	0.00159	U	0.0592	0.0592	0.0700	0.0485	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Lead-210	0.965	U	1.49	1.50		1.01	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Lead-212	0.443		0.107	0.119		0.0561	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Lead-214	0.383		0.144	0.151		0.0684	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Potassium-40	7.54		1.41	1.65		0.298	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Protactinium-231	0.412	U	1.83	1.83		2.00	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Protactinium-234	0.0441	U	0.0783	0.0785		0.291	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Radium-226	0.376		0.159	0.165	0.200	0.0733	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Radium-228	0.293		0.123	0.127		0.132	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Thallium-208	0.187		0.0739	0.0770		0.0315	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Thorium 228	0.443		0.107	0.119		0.0561	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Thorium-232	0.293		0.123	0.127		0.132	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Thorium-234	-0.878	U	0.941	0.947		0.945	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Uranium-235	0.0688	U	0.153	0.153		0.392	pCi/g	11/06/20 19:32	11/29/20 14:45	1
Uranium-238	-0.878	U	0.941	0.947		0.945	pCi/g	11/06/20 19:32	11/29/20 14:45	1

**Client Sample ID: HPPG-SFU-TU098B-025**

**Lab Sample ID: 160-40217-27**

Date Collected: 10/29/20 14:57

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.555		0.167	0.176		0.0403	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Actinium-227	0.285	U	0.507	0.508		0.341	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Bismuth-212	-0.472	U	1.00	1.01		0.784	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Bismuth-214	0.422		0.120	0.128		0.0328	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Cesium-137	-0.0247	U	0.0605	0.0605	0.0700	0.0449	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Lead-210	1.28		1.64	1.65		1.08	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Lead-212	0.517		0.106	0.119		0.0519	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Lead-214	0.432		0.135	0.142		0.0547	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Potassium-40	8.03		1.54	1.74		0.250	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Protactinium-231	-0.912	U	3.17	3.17		2.58	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Protactinium-234	0.112	U	0.296	0.296		0.214	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Radium-226	0.422		0.120	0.128	0.200	0.0328	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Radium-228	0.555		0.167	0.176		0.0403	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Thallium-208	0.214		0.0773	0.0803		0.0279	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Thorium 228	0.517		0.106	0.119		0.0519	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Thorium-232	0.555		0.167	0.176		0.0403	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Thorium-234	0.510		0.562	0.564		0.503	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Uranium-235	-0.0478	U	0.338	0.338		0.400	pCi/g	11/06/20 19:32	11/29/20 15:18	1
Uranium-238	0.510		0.562	0.564		0.503	pCi/g	11/06/20 19:32	11/29/20 15:18	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Page 67 of 88

Job ID: 160-40217-1  
SDG: GJ46599774

## Method: 905.0 - Total Beta Strontium (GFPC)

Lab Sample ID: MB 160-490265/23-A

Matrix: Solid

Analysis Batch: 491588

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 490265

Analyte	MB MB		Count (2σ+/-)	Total (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Total Beta Strontium	-0.02016	U	0.0539	0.0539	0.160	0.0460	pCi/g	11/25/20 14:30	12/11/20 07:07	1
<b>Carrier</b>										
Sr Carrier	96.3		40 - 110					Prepared	Analyzed	Dil Fac
								11/25/20 14:30	12/11/20 07:07	1

Lab Sample ID: LCS 160-490265/1-A

Matrix: Solid

Analysis Batch: 491444

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 490265

Analyte	Spike		LCS Result	LCS Qual	Total (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
	Added									
Total Beta Strontium	7.76		6.013		0.491	0.160	0.0470	pCi/g	77	75 - 125
<b>Carrier</b>										
Sr Carrier	109		40 - 110							

Lab Sample ID: MB 160-490272/10-B

Matrix: Solid

Analysis Batch: 491589

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 490272

Analyte	MB MB		Count (2σ+/-)	Total (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Total Beta Strontium	-0.02855	U	0.0589	0.0589	0.160	0.0506	pCi/g	11/25/20 15:25	12/11/20 08:11	1
<b>Carrier</b>										
Sr Carrier	99.4		40 - 110					Prepared	Analyzed	Dil Fac
								11/25/20 15:25	12/11/20 08:11	1

Lab Sample ID: LCS 160-490272/1-A

Matrix: Solid

Analysis Batch: 491588

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 490272

Analyte	Spike		LCS Result	LCS Qual	Total (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
	Added									
Total Beta Strontium	7.76		6.091		0.497	0.160	0.0387	pCi/g	78	75 - 125
<b>Carrier</b>										
Sr Carrier	106		40 - 110							

Eurofins TestAmerica, St. Louis

# QC Sample Results

Page 68 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

## Method: 905.0 - Total Beta Strontium (GFPC) (Continued)

Lab Sample ID: 160-40217-13 DU

Client Sample ID: HPPG-SFU-TU098B-011

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 491589

Prep Batch: 490272

Analyte	Sample	Sample	DU		DU		Total		LOQ	DLC	Unit	RER	RER	Limit
	Result	Qual	Result	Qual	(2σ+/-)	Uncert.								
Total Beta Strontium	0.0517		0.006533	U	0.0547	0.160	0.0445	pCi/g	0.42					1
<b>Carrier</b>														
Sr Carrier	107		Limits		40 - 110									

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-488491/1-A

Client Sample ID: Method Blank

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 490469

Prep Batch: 488491

Analyte	MB	MB	Count		Total		LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	(2σ+/-)	Uncert.	(2σ+/-)						
Actinium 228	-0.06306	U	0.102	0.103	0.103	0.103	0.140	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Actinium-227	0.08022	U	0.174	0.174	0.174	0.174	0.273	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Bismuth-212	-0.2634	U	0.741	0.741	0.741	0.741	0.586	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Bismuth-214	-0.09586	U	0.0828	0.0834	0.0834	0.0834	0.107	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Cesium-137	0.0000	U	0.00669	0.00669	0.00669	0.00669	0.0258	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Lead-210	0.4000	U	0.906	0.907	0.907	0.907	0.711	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Lead-212	-0.01314	U	0.0721	0.0721	0.0721	0.0721	0.0600	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Lead-214	-0.0001236	U	0.0765	0.0765	0.0765	0.0765	0.0621	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Potassium-40	0.1543	U	0.439	0.440	0.440	0.440	0.324	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Protactinium-231	0.0000	U	0.357	0.357	0.357	0.357	1.35	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Protactinium-234	0.08717	U	0.149	0.149	0.149	0.149	0.122	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Radium-226	-0.09586	U	0.0828	0.0834	0.0834	0.0834	0.107	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Radium-228	-0.06306	U	0.102	0.103	0.103	0.103	0.140	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Thallium-208	0.01082	U	0.0325	0.0325	0.0325	0.0325	0.0179	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Thorium 228	-0.01314	U	0.0721	0.0721	0.0721	0.0721	0.0600	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Thorium-232	-0.06306	U	0.102	0.103	0.103	0.103	0.140	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Thorium-234	0.09568	U	0.238	0.238	0.238	0.238	0.506	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Uranium-235	0.1032	U	0.213	0.213	0.213	0.213	0.226	pCi/g	11/06/20 18:15	11/29/20 15:51		1
Uranium-238	0.09568	U	0.238	0.238	0.238	0.238	0.506	pCi/g	11/06/20 18:15	11/29/20 15:51		1

Lab Sample ID: LCS 160-488491/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 490472

Prep Batch: 488491

Analyte	Spike	LCS	LCS	Total		LOQ	DLC	Unit	%Rec	Limits
	Added	Result	Qual	Uncert.	(2σ+/-)					
Americium-241	96.4	101.6		10.6	10.6	0.434	pCi/g	105	87 - 116	
Cesium-137	26.7	24.99		2.66	2.66	0.100	pCi/g	93	87 - 120	
Cobalt-60	9.51	9.107		0.958	0.958	0.0551	pCi/g	96	87 - 115	

Eurofins TestAmerica, St. Louis

# QC Sample Results

Page 69 of 88

 Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

 Job ID: 160-40217-1  
 SDG: GJ46599774

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID:** 160-40217-20 DU

**Client Sample ID:** HPPG-SFU-TU098B-018

**Matrix:** Solid

**Prep Type:** Total/NA

**Analysis Batch:** 490471

**Prep Batch:** 488491

Analyte	Sample	Sample	DU		DU		Total		RER	Limit
	Result	Qual	Result	Qual	(2σ+/-)	LOQ	DLC	Unit		
Actinium 228	0.444		0.4339		0.197		0.100	pCi/g	0.03	1
Actinium-227	0.180	U	-0.3416	U	0.653		0.391	pCi/g	0.53	1
Bismuth-212	0.000	U	0.7989		0.385		0.103	pCi/g	1.48	1
Bismuth-214	0.426		0.4747		0.211		0.0851	pCi/g	0.14	1
Cesium-137	0.0182	U	-0.03296	U	0.0677	0.0700	0.0526	pCi/g	0.47	1
Lead-210	0.569	U	1.272		1.50		0.992	pCi/g	0.27	1
Lead-212	0.389		0.4700		0.107		0.0434	pCi/g	0.40	1
Lead-214	0.332		0.4481		0.123		0.0694	pCi/g	0.54	1
Potassium-40	7.58		6.434		1.60		0.426	pCi/g	0.36	1
Protactinium-231	-0.729	U	-0.9130	U	3.14		2.56	pCi/g	0.03	1
Protactinium-234	-0.0511	U	-0.1148	U	0.348		0.283	pCi/g	0.11	1
Radium-226	0.426		0.4747		0.211	0.200	0.0851	pCi/g	0.14	1
Radium-228	0.444		0.4339		0.197		0.100	pCi/g	0.03	1
Thallium-208	0.133		0.1878		0.0721		0.0249	pCi/g	0.42	1
Thorium 228	0.389		0.4700		0.107		0.0434	pCi/g	0.40	1
Thorium-232	0.444		0.4339		0.197		0.100	pCi/g	0.03	1
Thorium-234	-0.349	U	0.4530	U	0.550		0.496	pCi/g	0.88	1
Uranium-235	0.0182	U	0.1711	U	0.283		0.222	pCi/g	0.31	1
Uranium-238	-0.349	U	0.4530	U	0.550		0.496	pCi/g	0.88	1

**Lab Sample ID:** MB 160-488492/1-A

**Client Sample ID:** Method Blank

**Matrix:** Solid

**Prep Type:** Total/NA

**Analysis Batch:** 490476

**Prep Batch:** 488492

Analyte	MB	MB	Count	Total		LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	(2σ+/-)	(2σ+/-)						
Actinium 228	0.01626	U	0.0459	0.0459		0.137	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Actinium-227	-0.01301	U	0.0606	0.0606		0.351	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Bismuth-212	0.3809	U	0.888	0.889		0.695	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Bismuth-214	-0.006734	U	0.00897	0.00899		0.200	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Cesium-137	-0.03088	U	0.0639	0.0640	0.0700	0.0492	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Lead-210	0.3962	U	1.59	1.59		1.26	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Lead-212	0.002141	U	0.103	0.103		0.0845	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Lead-214	-0.009276	U	0.0382	0.0382		0.106	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Potassium-40	0.1423	U	0.494	0.494		0.369	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Protactinium-231	0.3230	U	1.20	1.20		1.88	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Protactinium-234	-0.08694	U	0.278	0.278		0.225	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Radium-226	-0.006734	U	0.00897	0.00899	0.200	0.200	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Radium-228	0.01626	U	0.0459	0.0459		0.137	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Thallium-208	0.006815	U	0.00678	0.00682		0.0456	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Thorium 228	0.002141	U	0.103	0.103		0.0845	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Thorium-232	0.01626	U	0.0459	0.0459		0.137	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Thorium-234	0.06867	U	0.555	0.555		0.412	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Uranium-235	0.1572	U	0.325	0.326		0.353	pCi/g	11/06/20 19:32	11/29/20 14:44		1
Uranium-238	0.06867	U	0.555	0.555		0.412	pCi/g	11/06/20 19:32	11/29/20 14:44		1

Eurofins TestAmerica, St. Louis

# QC Sample Results

Page 70 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-488492/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 490621

Prep Batch: 488492

Analyte	Spike Added	LCS		Total		DLC	Unit	%Rec	%Rec. Limits
		Result	Qual	Uncert. (2σ+/-)	LOQ				
Americium-241	96.4	93.86		9.84		0.491	pCi/g	97	87 - 116
Cesium-137	26.7	25.46		2.71	0.0700	0.0750	pCi/g	95	87 - 120
Cobalt-60	9.51	9.160		0.960		0.0395	pCi/g	96	87 - 115

# QC Association Summary

Page 71 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

**Rad**

**Leach Batch: 488198**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40217-1	HPPG-F-025	Total/NA	Solid	Dry and Grind	
160-40217-2	HPPG-F-026	Total/NA	Solid	Dry and Grind	
160-40217-3	HPPG-SFU-TU098B-001	Total/NA	Solid	Dry and Grind	
160-40217-4	HPPG-SFU-TU098B-002	Total/NA	Solid	Dry and Grind	
160-40217-5	HPPG-SFU-TU098B-003	Total/NA	Solid	Dry and Grind	
160-40217-6	HPPG-SFU-TU098B-004	Total/NA	Solid	Dry and Grind	
160-40217-7	HPPG-SFU-TU098B-005	Total/NA	Solid	Dry and Grind	
160-40217-8	HPPG-SFU-TU098B-006	Total/NA	Solid	Dry and Grind	
160-40217-9	HPPG-SFU-TU098B-007	Total/NA	Solid	Dry and Grind	
160-40217-10	HPPG-SFU-TU098B-008	Total/NA	Solid	Dry and Grind	
160-40217-11	HPPG-SFU-TU098B-009	Total/NA	Solid	Dry and Grind	

**Leach Batch: 488207**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40217-12	HPPG-SFU-TU098B-010	Total/NA	Solid	Dry and Grind	
160-40217-13	HPPG-SFU-TU098B-011	Total/NA	Solid	Dry and Grind	
160-40217-14	HPPG-SFU-TU098B-012	Total/NA	Solid	Dry and Grind	
160-40217-15	HPPG-SFU-TU098B-013	Total/NA	Solid	Dry and Grind	
160-40217-16	HPPG-SFU-TU098B-014	Total/NA	Solid	Dry and Grind	
160-40217-17	HPPG-SFU-TU098B-015	Total/NA	Solid	Dry and Grind	
160-40217-18	HPPG-SFU-TU098B-016	Total/NA	Solid	Dry and Grind	
160-40217-19	HPPG-SFU-TU098B-017	Total/NA	Solid	Dry and Grind	
160-40217-20	HPPG-SFU-TU098B-018	Total/NA	Solid	Dry and Grind	
160-40217-21	HPPG-SFU-TU098B-019	Total/NA	Solid	Dry and Grind	
160-40217-22	HPPG-SFU-TU098B-020	Total/NA	Solid	Dry and Grind	
160-40217-23	HPPG-SFU-TU098B-021	Total/NA	Solid	Dry and Grind	
160-40217-24	HPPG-SFU-TU098B-022	Total/NA	Solid	Dry and Grind	
160-40217-25	HPPG-SFU-TU098B-023	Total/NA	Solid	Dry and Grind	
160-40217-26	HPPG-SFU-TU098B-024	Total/NA	Solid	Dry and Grind	
160-40217-27	HPPG-SFU-TU098B-025	Total/NA	Solid	Dry and Grind	
160-40217-13 DU	HPPG-SFU-TU098B-011	Total/NA	Solid	Dry and Grind	
160-40217-20 DU	HPPG-SFU-TU098B-018	Total/NA	Solid	Dry and Grind	

**Prep Batch: 488491**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40217-1	HPPG-F-025	Total/NA	Solid	Fill_Geo-21	488198
160-40217-2	HPPG-F-026	Total/NA	Solid	Fill_Geo-21	488198
160-40217-3	HPPG-SFU-TU098B-001	Total/NA	Solid	Fill_Geo-21	488198
160-40217-4	HPPG-SFU-TU098B-002	Total/NA	Solid	Fill_Geo-21	488198
160-40217-5	HPPG-SFU-TU098B-003	Total/NA	Solid	Fill_Geo-21	488198
160-40217-6	HPPG-SFU-TU098B-004	Total/NA	Solid	Fill_Geo-21	488198
160-40217-7	HPPG-SFU-TU098B-005	Total/NA	Solid	Fill_Geo-21	488198
160-40217-8	HPPG-SFU-TU098B-006	Total/NA	Solid	Fill_Geo-21	488198
160-40217-9	HPPG-SFU-TU098B-007	Total/NA	Solid	Fill_Geo-21	488198
160-40217-10	HPPG-SFU-TU098B-008	Total/NA	Solid	Fill_Geo-21	488198
160-40217-11	HPPG-SFU-TU098B-009	Total/NA	Solid	Fill_Geo-21	488198
160-40217-12	HPPG-SFU-TU098B-010	Total/NA	Solid	Fill_Geo-21	488207
160-40217-13	HPPG-SFU-TU098B-011	Total/NA	Solid	Fill_Geo-21	488207
160-40217-14	HPPG-SFU-TU098B-012	Total/NA	Solid	Fill_Geo-21	488207
160-40217-15	HPPG-SFU-TU098B-013	Total/NA	Solid	Fill_Geo-21	488207
160-40217-16	HPPG-SFU-TU098B-014	Total/NA	Solid	Fill_Geo-21	488207

Eurofins TestAmerica, St. Louis

# QC Association Summary

Page 72 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

## Rad (Continued)

### Prep Batch: 488491 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40217-17	HPPG-SFU-TU098B-015	Total/NA	Solid	Fill_Geo-21	488207
160-40217-18	HPPG-SFU-TU098B-016	Total/NA	Solid	Fill_Geo-21	488207
160-40217-19	HPPG-SFU-TU098B-017	Total/NA	Solid	Fill_Geo-21	488207
160-40217-20	HPPG-SFU-TU098B-018	Total/NA	Solid	Fill_Geo-21	488207
MB 160-488491/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-488491/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-40217-20 DU	HPPG-SFU-TU098B-018	Total/NA	Solid	Fill_Geo-21	488207

### Prep Batch: 488492

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40217-21	HPPG-SFU-TU098B-019	Total/NA	Solid	Fill_Geo-21	488207
160-40217-22	HPPG-SFU-TU098B-020	Total/NA	Solid	Fill_Geo-21	488207
160-40217-23	HPPG-SFU-TU098B-021	Total/NA	Solid	Fill_Geo-21	488207
160-40217-24	HPPG-SFU-TU098B-022	Total/NA	Solid	Fill_Geo-21	488207
160-40217-25	HPPG-SFU-TU098B-023	Total/NA	Solid	Fill_Geo-21	488207
160-40217-26	HPPG-SFU-TU098B-024	Total/NA	Solid	Fill_Geo-21	488207
160-40217-27	HPPG-SFU-TU098B-025	Total/NA	Solid	Fill_Geo-21	488207
MB 160-488492/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-488492/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	

### Prep Batch: 490265

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40217-1	HPPG-F-025	Total/NA	Solid	DPS-0	488198
160-40217-3	HPPG-SFU-TU098B-001	Total/NA	Solid	DPS-0	488198
MB 160-490265/23-A	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-490265/1-A	Lab Control Sample	Total/NA	Solid	DPS-0	

### Prep Batch: 490272

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40217-13	HPPG-SFU-TU098B-011	Total/NA	Solid	DPS-0	488207
160-40217-23	HPPG-SFU-TU098B-021	Total/NA	Solid	DPS-0	488207
MB 160-490272/10-B	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-490272/1-A	Lab Control Sample	Total/NA	Solid	DPS-0	
160-40217-13 DU	HPPG-SFU-TU098B-011	Total/NA	Solid	DPS-0	488207

# Tracer/Carrier Summary

Page 73 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40217-1  
SDG: GJ46599774

## Method: 905.0 - Total Beta Strontium (GFPC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Sr	(40-110)
160-40217-1	HPPG-F-025	105	
160-40217-3	HPPG-SFU-TU098B-001	96.8	
160-40217-13	HPPG-SFU-TU098B-011	107	
160-40217-13 DU	HPPG-SFU-TU098B-011	107	
160-40217-23	HPPG-SFU-TU098B-021	99.1	
LCS 160-490265/1-A	Lab Control Sample	109	
LCS 160-490272/1-A	Lab Control Sample	106	
MB 160-490265/23-A	Method Blank	96.3	
MB 160-490272/10-B	Method Blank	99.4	

### Tracer/Carrier Legend

Sr = Sr Carrier

Eurofins TestAmerica, St. Louis



## Environment Testing America

### ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

Laboratory Job ID: 160-40219-1  
Laboratory Sample Delivery Group: D11589464  
Client Project/Site: HPNS-Parcel G 501197

For:  
Aptim Federal Services LLC  
4005 Port Chicago Hwy, Suite 200  
Concord, California 94520

Attn: Rose Condit

*Rhonda Ridenhower*

---

Authorized for release by:  
12/15/2020 10:55:27 PM

Rhonda Ridenhower, Client Service Manager  
(314)298-8566  
Rhonda.Ridenhower@Eurofinset.com

#### LINKS

Review your project  
results through

**Total Access**

Have a Question?

Ask—  
The  
Expert

Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Chain of Custody . . . . .	5
Receipt Checklists . . . . .	7
Definitions/Glossary . . . . .	8
Method Summary . . . . .	9
Sample Summary . . . . .	10
Client Sample Results . . . . .	11
QC Sample Results . . . . .	12
QC Association Summary . . . . .	14
Tracer Carrier Summary . . . . .	15

# Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Page 76 of 88

Job ID: 160-40219-1  
SDG: D11589464

**Job ID: 160-40219-1**

**Laboratory: Eurofins TestAmerica, St. Louis**

**Narrative**

## CASE NARRATIVE

**Client: Aptim Federal Services LLC**

**Project: HPNS-Parcel G 501197**

**Report Number: 160-40219-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### RECEIPT

The samples were received on 11/02/2020; the samples arrived in good condition, properly preserved. The temperature of the coolers at

## Case Narrative

Page 77 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40219-1  
SDG: D11589464

### Job ID: 160-40219-1 (Continued)

#### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

receipt was 16.9 C.

#### **TOTAL BETA STRONTIUM (GFPC)**

Sample HPPG-SFU-TU098B-B-001 (160-40219-1) was analyzed for Total Beta Strontium (GFPC) in accordance with EPA 905. The samples were dried on 11/04/2020, prepared on 11/25/2020 and analyzed on 12/11/2020.

The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: HPPG-SFU-TU098B-B-001 (160-40219-1). The samples contained rocks of varying sizes.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)**

Sample HPPG-SFU-TU098B-B-001 (160-40219-1) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 11/04/2020, prepared on 11/06/2020 and analyzed on 11/29/2020.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from      Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

The method blank (MB) Z-score is within limits and is located in the level IV raw data.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



# CHAIN OF CUSTODY

Ref. Document # 501197RSY-024

Page 1 of 2

APTIM Federal Services, LLC

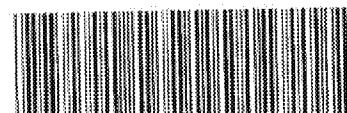
4005 Port Chicago Hwy  
Concord, CA 94520Project Manager: Lisa Bercik  
Phone #: (619)213-3389Send Report to: Rose Condit  
Phone/Fax Number: 415-987-0760  
Address: 4005 Port Chicago Hwy

Sample Lead: Lewis, Devin

Sample Tech(s):

				Project Number:		501197		Analysis Requested									
				Project Name:		Hunters Point Naval Shipyard: Parcel G Remedial Action											
				Project Location:		San Francisco, CA											
				Purchase Order #:		1159058											
				Shipment/Pickup Date:		10/30/2020											
				Waybill Number:		4457 0225 4382											
				Lab Destination:		Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046											
Lab Contact Name/ph #				Rhoeda Ridenbower (314)298-8566													
				Matrix	# of Containers	Strontium-89 (EPA 905 M0D)						Dose Rate uR/Hr		Evidence Bag ID		Comment	
						Gammic Spec (EPA 901.1 M) - Full 21 day ingrowth gamma											
				Preservatives (water)													
				Preservatives (soil)													
				Container Type													
Sample ID	Date	Time	Method	SO	1	16 oz. plastic jar	X	X				5	D1189464				
Special Instructions: 21 day ingrowth results only Analyze for Total Strontium as a screening step, and isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g																	
Turnaround Time:				3-day <input type="checkbox"/>	10-Day <input type="checkbox"/>	28-day <input type="checkbox"/>	Other <input type="checkbox"/>	Level of QC Required:		I	II	III	Project Specific				
Method Codes C = Composite G = Grab Matrix Codes: DW = Drinking Water; So = Soil; GW = Ground Water; SL = Sludge; WW = Waste Water; CP = Chip Samples; A = Air; ABS = Asbestos; PO = Pipe Opening																	
Relinquished By:		Relinquisher Signature:		Relinquish Date Time:		Received By:		Received Signature:		Receive Date Time:							
Lewis, Devin				10/30/2020 15:43		SHIPPEDTOLAB				FED EX							

\*\*\* Last 3 transfers shown above - Complete list of transfers on last page \*\*\*



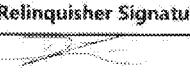
160-40219 Chain of Custody

*micha korrinkher* NOV 2 2020  
*08:50*  
 MICHA KORRINKHER



**All Transfers for COC 501197RSY-024**

Page 2 of 2

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		10/30/2020 15:43	SHIPPEDTOLAB		

FED EX

Micha Korrinkizer  
MICHA KORRINKIZER NOV 02 2020 08:50

## Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-40219-1  
SDG Number: D11589464**Login Number: 40219****List Source: Eurofins TestAmerica, St. Louis****List Number: 1****Creator: Hoerchler, Elizabeth M**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Definitions/Glossary

Page 81 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40219-1  
SDG: D11589464

## Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

## Method Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Page 82 of 88

Job ID: 160-40219-1  
SDG: D11589464

Method	Method Description	Protocol	Laboratory
905.0	Total Beta Strontium (GFPC)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-0	Preparation, Digestion/ Precipitate	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

### Protocol References:

DOE = U.S. Department of Energy

None = None

### Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# Sample Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Page 83 of 88

Job ID: 160-40219-1  
SDG: D11589464

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
160-40219-1	HPPG-SFU-TU098B-B-001	Solid	10/30/20 13:16	11/02/20 08:50	

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Page 84 of 88

Job ID: 160-40219-1  
SDG: D11589464

**Client Sample ID: HPPG-SFU-TU098B-B-001**

**Lab Sample ID: 160-40219-1**

Date Collected: 10/30/20 13:16

Matrix: Solid

Date Received: 11/02/20 08:50

## Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	-0.0194	U	0.0576	0.0576	0.160	0.0488	pCi/g	11/25/20 15:25	12/11/20 08:10	1
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Sr Carrier	106		40 - 110					11/25/20 15:25	12/11/20 08:10	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	<b>0.631</b>		0.165	0.177		0.0440	pCi/g	11/06/20 19:32	11/29/20 14:40	1
Actinium-227	-0.215	U	0.655	0.655		0.382	pCi/g	11/06/20 19:32	11/29/20 14:40	1
Bismuth-212	0.257	U	0.667	0.668		0.527	pCi/g	11/06/20 19:32	11/29/20 14:40	1
<b>Bismuth-214</b>	<b>0.550</b>		0.123	0.135		0.0433	pCi/g	11/06/20 19:32	11/29/20 14:40	1
Cesium-137	0.00289	U	0.0575	0.0575	0.0700	0.0472	pCi/g	11/06/20 19:32	11/29/20 14:40	1
Lead-210	0.632	U	1.40	1.40		1.12	pCi/g	11/06/20 19:32	11/29/20 14:40	1
<b>Lead-212</b>	<b>0.558</b>		0.0909	0.116		0.0374	pCi/g	11/06/20 19:32	11/29/20 14:40	1
<b>Lead-214</b>	<b>0.434</b>		0.102	0.111		0.0542	pCi/g	11/06/20 19:32	11/29/20 14:40	1
<b>Potassium-40</b>	<b>7.94</b>		1.22	1.46		0.281	pCi/g	11/06/20 19:32	11/29/20 14:40	1
Protactinium-231	0.000	U	0.338	0.338		2.09	pCi/g	11/06/20 19:32	11/29/20 14:40	1
Protactinium-234	-0.105	U	0.294	0.294		0.239	pCi/g	11/06/20 19:32	11/29/20 14:40	1
<b>Radium-226</b>	<b>0.550</b>		0.123	0.135	0.200	0.0433	pCi/g	11/06/20 19:32	11/29/20 14:40	1
<b>Radium-228</b>	<b>0.631</b>		0.165	0.177		0.0440	pCi/g	11/06/20 19:32	11/29/20 14:40	1
<b>Thallium-208</b>	<b>0.172</b>		0.0779	0.0799		0.0362	pCi/g	11/06/20 19:32	11/29/20 14:40	1
<b>Thorium 228</b>	<b>0.558</b>		0.0909	0.116		0.0374	pCi/g	11/06/20 19:32	11/29/20 14:40	1
<b>Thorium-232</b>	<b>0.631</b>		0.165	0.177		0.0440	pCi/g	11/06/20 19:32	11/29/20 14:40	1
Thorium-234	-0.389	U	0.445	0.448		1.04	pCi/g	11/06/20 19:32	11/29/20 14:40	1
Uranium-235	0.214	U	0.205	0.206		0.428	pCi/g	11/06/20 19:32	11/29/20 14:40	1
Uranium-238	-0.389	U	0.445	0.448		1.04	pCi/g	11/06/20 19:32	11/29/20 14:40	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Page 85 of 88

Job ID: 160-40219-1  
SDG: D11589464

## Method: 905.0 - Total Beta Strontium (GFPC)

**Lab Sample ID:** MB 160-490272/10-B

**Matrix:** Solid

**Analysis Batch:** 491589

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 490272

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Total Beta Strontium	-0.02855	U	0.0589	0.0589	0.160	0.0506	pCi/g	11/25/20 15:25	12/11/20 08:11	1
<hr/>										
Carrier	MB	MB	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac		
	Result	Qualifier								
Sr Carrier	99.4				40 - 110	11/25/20 15:25	12/11/20 08:11	1		

**Lab Sample ID:** LCS 160-490272/1-A

**Matrix:** Solid

**Analysis Batch:** 491588

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 490272

Analyte	MB	MB	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec.Lim	%Rec. Limits
	Result	Qualifier									
Total Beta Strontium			7.76	6.091		0.497	0.160	0.0387	pCi/g	78	75 - 125
<hr/>											
Carrier	LCS	LCS	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
	Result	Qualifier									
Sr Carrier	106				40 - 110						

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

**Lab Sample ID:** MB 160-488492/1-A

**Matrix:** Solid

**Analysis Batch:** 490476

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 488492

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Actinium 228	0.01626	U	0.0459	0.0459	0.137	0.137	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Actinium-227	-0.01301	U	0.0606	0.0606	0.351	0.351	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Bismuth-212	0.3809	U	0.888	0.889	0.695	0.695	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Bismuth-214	-0.006734	U	0.00897	0.00899	0.200	0.200	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Cesium-137	-0.03088	U	0.0639	0.0640	0.0700	0.0492	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Lead-210	0.3962	U	1.59	1.59		1.26	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Lead-212	0.002141	U	0.103	0.103		0.0845	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Lead-214	-0.009276	U	0.0382	0.0382		0.106	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Potassium-40	0.1423	U	0.494	0.494		0.369	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Protactinium-231	0.3230	U	1.20	1.20		1.88	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Protactinium-234	-0.08694	U	0.278	0.278		0.225	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Radium-226	-0.006734	U	0.00897	0.00899	0.200	0.200	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Radium-228	0.01626	U	0.0459	0.0459		0.137	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Thallium-208	0.006815	U	0.00678	0.00682		0.0456	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Thorium 228	0.002141	U	0.103	0.103		0.0845	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Thorium-232	0.01626	U	0.0459	0.0459		0.137	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Thorium-234	0.06867	U	0.555	0.555		0.412	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Uranium-235	0.1572	U	0.325	0.326		0.353	pCi/g	11/06/20 19:32	11/29/20 14:44	1
Uranium-238	0.06867	U	0.555	0.555		0.412	pCi/g	11/06/20 19:32	11/29/20 14:44	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

Page 86 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40219-1  
SDG: D11589464

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID:** LCS 160-488492/2-A

**Client Sample ID:** Lab Control Sample

**Matrix:** Solid

**Prep Type:** Total/NA

**Analysis Batch:** 490621

**Prep Batch:** 488492

Analyte	Spike Added	LCS		Uncert. (2σ+/-)	Total		%Rec.	Limits
		Result	Qual		LOQ	DLC		
Americium-241	96.4	93.86		9.84		0.491	pCi/g	97 87 - 116
Cesium-137	26.7	25.46		2.71	0.0700	0.0750	pCi/g	95 87 - 120
Cobalt-60	9.51	9.160		0.960		0.0395	pCi/g	96 87 - 115

**Lab Sample ID:** 160-40219-1 DU

**Client Sample ID:** HPPG-SFU-TU098B-B-001

**Matrix:** Solid

**Prep Type:** Total/NA

**Analysis Batch:** 490471

**Prep Batch:** 488492

Analyte	Sample Result	Sample Qual	DU		Uncert. (2σ+/-)	Total		RER	Limit
			Result	Qual		LOQ	DLC		
Actinium 228	0.631		0.4877		0.176		0.134	pCi/g	0.41 1
Actinium-227	-0.215	U		0.3144	U	0.526		0.321	pCi/g 0.45 1
Bismuth-212	0.257	U		-0.3402	U	1.06		0.847	pCi/g 0.35 1
Bismuth-214	0.550			0.4330		0.155		0.0790	pCi/g 0.40 1
Cesium-137	0.00289	U		-0.05512	U	0.0899	0.0700	0.0697	pCi/g 0.39 1
Lead-210	0.632	U		-1.013	U	2.00		1.68	pCi/g 0.48 1
Lead-212	0.558			0.5703		0.122		0.0450	pCi/g 0.05 1
Lead-214	0.434			0.6093		0.156		0.0553	pCi/g 0.66 1
Potassium-40	7.94			9.122		1.72		0.135	pCi/g 0.37 1
Protactinium-231	0.000	U		-1.165	U	3.78		3.08	pCi/g 0.28 1
Protactinium-234	-0.105	U		-0.1171	U	0.355		0.289	pCi/g 0.02 1
Radium-226	0.550			0.4330		0.155	0.200	0.0790	pCi/g 0.40 1
Radium-228	0.631			0.4877		0.176		0.134	pCi/g 0.41 1
Thallium-208	0.172			0.2624		0.0677		0.00861	pCi/g 0.61 1
Thorium 228	0.558			0.5703		0.122		0.0450	pCi/g 0.05 1
Thorium-232	0.631			0.4877		0.176		0.134	pCi/g 0.41 1
Thorium-234	-0.389	U		0.3060	U	0.556		0.463	pCi/g 0.69 1
Uranium-235	0.214	U		0.1681	U	0.317		0.588	pCi/g 0.09 1
Uranium-238	-0.389	U		0.3060	U	0.556		0.463	pCi/g 0.69 1

Eurofins TestAmerica, St. Louis

# QC Association Summary

Page 87 of 88

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40219-1  
SDG: D11589464

Rad

Leach Batch: 488207

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40219-1	HPPG-SFU-TU098B-B-001	Total/NA	Solid	Dry and Grind	
160-40219-1 DU	HPPG-SFU-TU098B-B-001	Total/NA	Solid	Dry and Grind	

Prep Batch: 488492

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40219-1	HPPG-SFU-TU098B-B-001	Total/NA	Solid	Fill_Geo-21	
MB 160-488492/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-488492/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-40219-1 DU	HPPG-SFU-TU098B-B-001	Total/NA	Solid	Fill_Geo-21	488207

Prep Batch: 490272

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40219-1	HPPG-SFU-TU098B-B-001	Total/NA	Solid	DPS-0	
MB 160-490272/10-B	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-490272/1-A	Lab Control Sample	Total/NA	Solid	DPS-0	488207

# Tracer/Carrier Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Page 88 of 88

Job ID: 160-40219-1  
SDG: D11589464

## Method: 905.0 - Total Beta Strontium (GFPC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Sr	(40-110)
160-40219-1	HPPG-SFU-TU098B-B-001	106	
LCS 160-490272/1-A	Lab Control Sample	106	
MB 160-490272/10-B	Method Blank	99.4	

### Tracer/Carrier Legend

Sr = Sr Carrier

Eurofins TestAmerica, St. Louis